CORONARY ANGIOPLASTY: IMPACT ON RISK FACTORS AND PATIENTS' UNDERSTANDING OF THE SEVERITY OF THEIR CONDITION

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ABSTRACT

Objective:

To explore self-reported changes in coronary risk factors by patients three to nine months following coronary artery angioplasty.

Design:

Descriptive survey.

Subjects:

Two hundred and thirty four patients, three to nine months after elective angioplasty. Patients were self-selected from a convenience sample of all patients undergoing angioplasty within a six-month period in two major metropolitan hospitals in Melbourne.

Main outcome measure:

Self-reported responses to questions exploring patient's risk factor reduction and understanding of their condition.

Results:

Two hundred and thirty four (41.7%) out of 560 questionnaires were returned. Forty percent of subjects reported the recurrence of chest pain and 42% believed they no longer had coronary artery disease. 85% of respondents reported making at least one modification to their risk factors and stress was the most common risk factor identified.

Conclusion:

Coronary artery angioplasty is one of the most common elective interventions for coronary artery disease. It restores blood flow in the diseased vessel but cannot treat the underlying disease processes. Although the majority of patients had altered their lifestyle and reduced at least one risk factor, 40% of patients in this study had a recurrence of chest pain and 42% believed their condition had been cured. Diet modification, increased exercise and stress reduction were the top three changes in lifestyle reported. The findings suggest there is a major need for better health education and follow-up for patients after coronary artery angioplasty.

INTRODUCTION

Cardiovascular disease is a major cause of morbidity and mortality in Australia. In 1999, it was responsible for 29% of all deaths. Coronary artery disease (CAD) is the leading cardiovascular cause of death accounting for 27, 825 deaths or 22% of all deaths in Australia (National Heart Foundation 2001).

Cardiovascular disease is closely linked to lifestyle and by modifying cardiac risk factors an individual can significantly reduce their risk of developing the disease or reduce the severity of an existing condition. The National Heart Foundation released the most recent data on risk factors in the Australian population in 1999. More than 10 million Australians (over 80% of the adult population) had at least one of the following cardiovascular risk factors: tobacco smoking, physical inactivity, high blood pressure, or overweight, and about 80% of men and 75% of women had at least one of these risk factors.

Percutaneous transluminal coronary angioplasty (PTCA)

PTCA was first performed on a human in 1977 and by 1980 two units in Australia had performed 11 procedures. In 1985 there were 13 units in Australia performing the procedure and 1,244 PTCAs had been carried out. The number of units performing the procedure continued to grow with 4,904 procedures performed by 20 units in 1990 and 13, 854 PTCAs performed by 42 units in 1998. Davies and Senes (2002) have identified the following trends in PTCA in Australia. By 1999 there were:

- 57 interventional cardiology units in Australia.
- 19,444 PTCA procedures were performed, 7% more than the previous year. This compares with 14% increase between 1997-1998 and 15% increase from 1996-1997.
- A total of 122 physicians performed the procedure in the 57 cardiology units.
- The most common age for a male patient to have the procedure is 60-64 (15.5%) and 65-69 (15.1%). The most common age for females is 70-74 (19.8%) followed by 65-69 (16.7%).
- The average length of stay was 3.8 days, with a median length of stay of 2.0 days.
- Twenty percent of the procedures were repeats and in 45% of these cases these repeats occurred within 12 months.
- Stents were inserted in 92% of PTCA patients, up from 87% of patients in 1998 and only 54% of patients in 1996.

Coronary artery angioplasty and stenting are among the most common interventions for established CAD. Technological, clinical and organisational advances means that angioplasty can be offered as a safe, relatively atraumatic short-stay procedure. However, it is clear that the procedure cannot alter the underlying causes of CAD and health education is an essential component of treatment. Angioplasty patients currently spend only a short time as an in-patient and it is not clear if health promotion activities are a significant element of the hospital stay. Without a focus on health education and lifestyle modification there is a risk that coronary artery angioplasty may appear to some patients to offer a 'quick fix' to the problem of coronary artery disease. This study was designed to explore patients understanding of their disease and if they reduced cardiovascular disease risk factors by lifestyle modification.

METHODOLOGY

Purpose

The primary purpose of this study was to determine if patients reported a modification in their coronary risk factors and lifestyle three to nine months after undergoing PTCA for CAD. Perceived limitations/complications following the PTCA were also investigated, along with the patients' knowledge and understanding of the long-term nature of their CAD.

Research design

A descriptive survey design was selected for this study, using a questionnaire for data collection. This approach was appropriate to the purpose as little was known about the perceptions, attitudes, knowledge and experiences of patients undergoing PTCA in Melbourne hospitals for the treatment of CAD.

Population and sampling

A convenience sample was used; patients were eligible for inclusion into the study if they had undergone an elective PTCA at either of two large public metropolitan teaching hospitals in Melbourne, Victoria, Australia. One hospital was located to the north of the city, the other to the south. These two hospitals were chosen as they perform the greatest number of PTCA procedures in Victoria.

Sample size

In this study, 560 questionnaires were sent in the mail to patients who met the selection criteria. The sample size of 560 represents the total number of patients who had undergone the procedure from 1 December 2000 to 31 May 2001. Two hundred and thirty-four questionnaires were returned to the researcher, a response rate of 41.7%. Twenty envelopes were returned to the researcher where the person was not known at the address. Three spouses returned questionnaires stating their partner had died since the procedure.

The questionnaire

Part 1 of the questionnaire was designed by the researcher to collect demographic data and to ask questions specifically related to the patient's experience of PTCA.

Items in Part 1 collected data related to quality of life, risk factors, smoking, cholesterol and anxiety, and benefits and limitations associated with the procedure.

Items in Part 2 of the questionnaire collected data about healthy lifestyle in relation to nutrition, exercise, stress, relationships, and, health promoting lifestyle. The term healthy lifestyle has been described in the literature in various ways; sometimes narrowly as simply the avoidance of bad habits, and sometimes broadly as all behaviours that have a positive impact on health status. Pender (1996) in her Health Promotion Model (HPM) suggested that health as a positive life process may be experienced and expressed through lifestyle patterns, person/environ-ment interactional patterns that become increasingly complex throughout the lifespan.

Part 2 of the questionnaire is the 'Health-Promoting Lifestyle Profile II' (HPLP II) developed by Walker et al (1987). HPLP was developed to test Pender's HPM, and has been used in a number of studies. The HPLP II measures health-promoting lifestyle, conceptualised by a 'multidimensional pattern of self-initiated actions and perceptions that serve to maintain or enhance the level of wellness, self-actualisation, and fulfilment of the individual' (Walker et al 1987, p.77).

A revised and updated version, the HPLP II was released in 1995. This 52-item instrument uses a four-point ordinal response format to measure the frequency of self-reported health-promoting behaviours. The scale assesses the frequency with which individuals report

engaging in activities directed towards increasing their level of health and well-being. A high score indicates a higher health-promoting level of behaviour in all instances. Responses range from 1, 'never' to 4, 'routinely'.

The HPLP II measures the following six dimensions of health-promoting lifestyle:

- health responsibility;
- physical activity;
- nutrition;
- spiritual growth;
- interpersonal relationships; and,
- stress management.

Reliability and validity

Part 1 of the questionnaire in this study was constructed by the researcher and was tested for reliability and face validity. Frank-Stromborg and Olsen (1997) reported that Part 2 of this questionnaire (HPLP II) was evaluated in a sample of 712 adults. Construct, convergent and criterion-related validity have all been reported. Test-retest reliability for the HPLP II questionnaire has been reported as Pearson's r correlation coefficient where r=0.892 (Frank-Stromborg and Olsen 1997).

Data analysis

Part 1 of the tool was analysed in SPSS using descriptive statistics of percentages, means and standard deviations. For Part 2, a score for overall health promoting lifestyle was obtained by calculating a mean of the individual's responses to all items: the sub-scale scores are obtained similarly by calculating a mean of the responses to sub-scale items.

Ethical considerations

Permission to conduct the study was obtained from the human research ethics committees at the two participating hospitals where the patients were recruited. Consent was assumed if the patients returned the questionnaire. Patients were informed that anonymity and confidentiality would be maintained at all times.

RESULTS

The majority of the respondents were male (166 or 71%), 65 (28%) were female. In three cases the respondent did not indicate their gender. Table 1 summarises the age of the respondents; the highest numbers were in the 61-80 age group with relativity few angioplasties being performed on those under 40 years of age or over 80 years of age.

The majority of the respondents were married (table 2) and lived in the metropolitan area (table 3).

When asked if they understood they had CAD prior to having the PTCA, 176 (75%) said yes whereas 23% (53) did not seem to know the nature of their condition. Five people (3%) failed to answer the question. When asked if they still had CAD after having the angioplasty the majority (128 or 54%) understood that they still had the disease but a substantial group (97 or 43%) believed the procedure had 'cured' the condition. Nine people (4%) failed to answer this question.

This perception may be a result of a short hospital stay, a quick recovery time, and a procedure conducted with little discomfort compared to coronary artery grafts. Gaw-Ens and Laing (1994) speculated that these patients

Table 1: Age of respondents

Age	n	%
31–40	5	2
41–50	23	10
51–60	47	20
61–70	86	37
71–80	63	27
81–90	5	2
Missing	5	2

Table 2: Marital status

Marital status	n	%
Single	19	8
Married	150	64
Partner	7	3
Widowed	30	13
Divorced	25	11
Missing	3	1

Table 3: Residential location

Location	n	%
Metropolitan	126	54
Rural	95	40
Other	7	3
Missing	6	3

Table 4: Age and chest pain after PTCA

60%	patients 31-40 years
48%	patients 41-50 years
43.5%	patients 51-60 years
39.5%	patients 61-70 years
32%	patients 71-80 years
20%	patients 81-90 years

Table 5: Risk factors identified

Age	Stress	Blood pressure	Lack of exercise	Smoking	Poor diet
31-40	3	7	1	2	2
41-50	16	14	11	8	13
51-60	25	24	13	16	21
61-70	43	24	13	20	24
71-80	27	2	11	10	15
81-90	1	3	2	0	1
TOTAL	**115**	**74**	**51**	**56**	**76**

may consider PTCA to be curative of their coronary artery disease. Cronin et al (2000) and Gaw (1992) also postulated that patients in their studies did not feel the need to make changes to their behaviours because they felt they had been cured by the PTCA.

These studies hypothesised, postulated or speculated that patients felt they had been cured. No studies could be located that expressly asked this question. This current study did just that by asking the question 'do you believe you still have coronary artery disease following coronary angioplasty?'

Ninety-two (40%) of the patients reported experiencing chest pain in the months after the PTCA. Chest pain was reported by 35% of women compared with 40% of men while five people (2%) failed to answer this question. Table 4 demonstrates the occurrence of chest pain in the different age groups. It is clear that the younger respondents experienced more recurrence of chest pain after PTCA. Of the 92 patients experiencing chest pain, 29 had no understanding they still had CAD.

The recurrence of chest pain is a major finding of this study although similar recurrence rates have been reported elsewhere in the literature. These results are comparable to the study on restenosis by Levine et al (1995) who report the incidence of restenosis as 40% following PTCA. The chest pain described by patients in this study may be due to restenosis or may be new lesions in the coronary arteries.

The higher recurrence of chest pain in the younger patient is interesting, as it has not previously been reported in the literature on PTCA. The number of young patients in this study is small accounting for only 12% of the total population group but 48%-60% of these younger patients did experience further chest pain.

Patients were asked to identify the risk factors they felt put them at risk of coronary artery disease. The results by age group are shown in table 5. Stress was the most common risk factor identified followed by poor diet, high blood pressure, smoking and lack of exercise. When asked about modifications to their lifestyle with regard to risk factors, 123 reported improving their diet, 98 increasing exercise, 83 reducing stress and 40 said they had stopped smoking (more than one factor could be listed). Fourteen people reported no modification of lifestyle. Although stress was the most common risk factor identified better diet was the most frequently reported modification.

A score for overall health-promoting lifestyle is obtained by calculating a mean of the individual's response to all 52 items; the six sub-scale scores are the means of responses to sub-scale questions. The use of mean scores retains the 1-4 measurement of item responses and allows meaningful comparisons of scores across sub-scales. The overall mean score for the HPLP II was 2.55 with a standard deviation of 0.50. The scores for the individual subscales are listed in table 6. The findings for each subscale are discussed in more detail below.

Table 6: Health promotion lifestyle scores for the six subscales

HPLP II sub-scales	Mean	Standard deviation
Health responsibility	2.35	.57
Physical activity	2.29	.73
Nutrition	2.95	.56
Spiritual growth	2.69	.65
Interpersonal relations	2.73	.55
Stress management	2.63	.58

Nutrition

Even though the greatest number of patients reported modifying and improving their diet as the most common way of reducing risk factors, poor diet was listed as the second most common coronary artery risk factor for the patients in this research. It was evident that the patients in this study found it easier to modify and change their diet than to implement any of the other behaviour modifications related to risk factors. Supporting this finding, part 2 of the questionnaire (HPLP II) found nutrition to have the highest health promoting rating.

Stress management:

In part 1 of the questionnaire stress was the most commonly identified risk factor but ranked third in terms of risk modification. In the HPLP II section of the

questionnaire stress management was rated fourth out of the six subscales. Patients in this current study commonly experienced stress and have indicated they were not confident in their ability to manage the stress in their lives. The finding that patients believed stress to be a major contributing factor for their CAD was unexpected. Few authors' address stress in relation to PTCA in their research, and the Heart Foundation of Australia does not list stress as a risk factor.

Interpersonal relations

This part of the questionnaire explored the issue of feelings and relationships with others. The finding here is that interpersonal relations was reported as the second highest rating of health promoting lifestyle. This indicated that having someone to care for them was very important in the lives of the patients. Many patients reported they had meaningful relationships with someone. The high rating of relationships by patients in this study stressed the significance of having family and friends available, especially as many of the patients did not feel they had a supportive relationship with anyone during their recovery from PTCA.

Spiritual growth

Spiritual growth was rated third in the health promoting lifestyle scale. This section explored patient's feelings about themselves. There is little research on spiritual growth and awareness in cardiac patients, although their life experiences, both before and after an acute cardiac event, would make an intriguing area of study. In this current study, many patients reported 'often' incorporating behaviours that characterised spiritual growth into their daily lives. Three quarters of the patients felt they had made positive changes to the way they are living following PTCA.

Health responsibility

Health responsibility was the fifth rated HPLP II subscale. This section of the instrument explores how patients manage their own health by ascertaining if they seek medical assistance for symptoms or ask for advice from health professionals. When asked if they reported chest pain to a health professional, less than half of the patients reported they would always do so, with a surprising 10% who reported they would never report chest pain. Only 27% would always question a doctor in order to understand their instructions, with 11% stating they would never question instructions.

Physical activity

Despite the benefits associated with regular exercise, patients in this study reported the lowest ranking in relation to incorporation of physical activity into their lifestyle. Forty-eight percent of patients never exercised in leisure activities, with 23% never following an exercise program. Too little exercise was the least reported risk factor in part 1 of the questionnaire and increasing the amount of daily exercise was the second highest modification reported. The AIHW (2000) reported that only 57% of the Australian adult population take sufficient physical activity for health.

DISCUSSION

PTCA has been conducted in Australian hospitals for many years as one of the treatment options for patients with potentially life threatening CAD, with the number of cases dramatically increasing each year. As CAD is potentially preventable in many people, the challenge for nurses and other health care professionals is to implement strategies, which best assist patients to make lifestyle choices that involve modification of their cardiac risk factors.

The most frequently reported complication following PTCA was chest pain, occurring in nearly 40% of patients. This chest pain may be related to restenosis of the coronary artery that has been stented, or it may be indicative of new coronary artery disease in other vessels. Despite the potential seriousness of this chest pain, few patients responded appropriately and reported chest pain to their doctor.

Another important finding identified by this study is that many patients do not understand they still have CAD. Nearly half the patients in this study believed their coronary artery disease has been cured by the PTCA. Even though the culprit lesion has been repaired, the chance is high that without modification of risk factors, patients will develop further chest pain indicating the presence of coronary artery disease.

Surprisingly, stress was the most commonly reported risk factor. Stress management was rated fourth in the HPLP II tool, and it was the third ranked risk factor to be modified in part 1 of the data collection tool. Clearly, stress management techniques need to be better addressed in pre procedure education programs and in cardiac rehabilitation programs.

CONCLUSION

This study has added to the body of research using the HPLP II tool to gather information on health promoting lifestyles in different groups of patients. Although the HPLP I tool has been used once previously on PTCA patients (Song and Lee 2001), the HPLP II tool has not been used with the PTCA patient population group prior to this study, nor has it been used in an Australian population group.

Even though the use of a convenience sample and the low response rate may limit generalisation, this study has raised some key issues and supports the suggestion that PTCA while providing a 'technical fix' is failing in its current form to meet the needs of patients with CAD.

Results from this study suggest that patients do not consistently include health-promoting behaviours into

their lifestyle following PTCA. Nurses working with these patients need to better address their educative requirements in relation to modification of cardiac risk factors. This study highlights that advanced nursing practice lies more in assisting patients to make informed choices and less in mastering the technology of modern health care.

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