# CLINICAL PATHWAYS FOR FRACTURED NECK OF FEMUR: A COHORT STUDY OF HEALTH RELATED QUALITY OF LIFE, PATIENT SATISFACTION AND CLINICAL OUTCOME

*Nick Santamaria, RN, RPN, BAppSc(AdvNsg), MEdSt, GradDipHlthEd, PhD, MRCNA, is Principal Research Scientist, The Alfred Hospital and Associate Professor, University of Melbourne, Australia*

*Liza Houghton, RN, BAppSc(Nsg), GradCertCritCare, is Integration of Care Manager, Peter MacCallum Cancer Institute, Australia*

*Lara Kimmel, BPhysio, is Senior Musculo-skeletal Physiotherapist, The Alfred Hospital, Australia*

*Alisa Graham, BHSc(OT), is Occupational Therapist, The Alfred Hospital, Australia*

***Accepted for publication October 2002***

ACKNOWLEDGEMENTS

This study was supported by a grant from the Department of Human Services, Victoria, Quality Improvement Funding Scheme.

Key words: fractured neck of femur, clinical pathway, health-related quality of life, patient satisfaction

## ABSTRACT

**The aim of this study was to compare the health related quality of life (HRQoL), satisfaction and functional outcomes of patients with fractured neck of femur treated with standard care to those treated with a clinical pathway at a major Melbourne university teaching hospital. A 12-month prospective cohort study was conducted comprising 57 patients admitted via the emergency department with a primary diagnosis of fractured neck of femur. Of these, 28 were treated with standard care and 29 using a coordinated multidisciplinary clinical pathway for fractured neck of femur. Outcome measures included; Medical Outcomes Study Short Form (SF-36), Modified Barthels Index (MBI), Timed Up and Go (TU&G), Patient Satisfaction and Perception Form (PSPF) and clinical indicators including; length of stay, time to mobilise, and, complication rates.**

**Results indicated that there was no significant difference between the groups on clinical and functional outcome, quality of life and satisfaction. Pathway patients had a 3.3 day shorter length of stay and less complications than standard care patients. We conclude that patients cared for under a clinical pathway for fractured neck of femur in this study did not experience decreased health related quality of life or satisfaction with care.**

## INTRODUCTION AND BACKGROUND

Nurses have traditionally focused on the restoration of health in its broadest sense. Clinical outcome is often interpreted by nurses to include the quality of life of the individual as well as the functional and physiological outcomes. This is not to suggest that other health care disciplinary groups do not hold similar beliefs about the importance of quality of life and patient satisfaction, however, nurses have long regarded quality of life as an essential element of the assessment of clinical outcome. The increasingly common use of multidisciplinary clinical pathways for the management of a wide range of surgical conditions has been credited with improved clinical outcomes, reduced complications and improved cost effectiveness. There is, however, very little evidence on the effects of using clinical pathways on patient quality of life and satisfaction with care delivery. As a consequence we undertook a study to explore the effects on quality of life and satisfaction with care of patients who underwent treatment of a fractured neck of femur which was guided by a multidisciplinary clinical pathway.

## LITERATURE REVIEW

Fractures of the proximal femur (hip fracture) represent one of the most important causes of morbidity and mortality worldwide (Lyons 1997; Pitto 1994; Keene et al 1993). In the United States there are more than 250,000 hip fractures per year and over 60,000 annually in the United Kingdom. Mortality in the 12 months following hip fracture has been reported at 25% with a large proportion of survivors not returning to their premorbid functional level (Cooper 1997; Baudoin et al 1996). The incidence of

hip fractures in Australia in 1996 was 15,206 and the rate is projected to double in the next 25 years as the Australian population continues to age (Sanders et al 1999).

The continuing increase in demand for acute hospital beds combined with an overall reduction in the Victorian acute bed availability from 4.4 to 3.2 per 1000 population has been noted by MacIntyre et al (1997) as having resulted in an increase in elective surgical waiting lists. Hip fractures contribute to this problem as a result of the relatively long length of acute treatment which has been reported to range from 6.6 to 32 days (Choong et al 2000; Schurch et al 1996; Lavernia 1998; Swanson et al 1998; Tallis and Balla 1995). The total annual health care expenditure on hip fractures in the United States has been estimated at over US$8.7 billion (Keene et al 1993). The current average cost of acute treatment in Australia per hip fracture, reported by Randell et al (1995) as $16,000, combined with the previously noted increased incidence has resulted in many hospitals investigating methods of improving the quality and efficiency of the treatment of hip fractures.

One approach to improving the quality and efficiency of the acute treatment of hip fractures has been the use of clinical pathways that aim to standardise and streamline treatment whilst improving quality and cost effectiveness (Antioch et al 2001; Wigfield and Boon 1996; Grudich 1991). The success of clinical pathways in elective joint arthroplasty has been documented by Dowsey et al (1999) and in hip fracture by Choong et al 2000, Tallis and Balla 1995; and, Ogilvie-Harris et al 1993. A number of studies report health related quality of life (HRQoL) in elective arthroplasty or following hip fracture (Hozak et al 1997; Leiberman et al 1997; March et al 1999). However, there is no evidence to date of the effects of the use of clinical pathways for hip fractures on HRQoL or patient satisfaction. It is not possible therefore, to state whether pathways have a positive, negative or neutral influence on HRQoL or patient satisfaction.

As part of a quality improvement program at the Alfred Hospital, Melbourne, Australia, the orthopaedic department developed and implemented a multidisciplinary clinical pathway for hip fracture.

The pathway was developed by a group comprising clinicians from nursing, medicine, physiotherapy, nutrition, social work and occupational therapy. The pathway specifies responsibilities by discipline and the timeframe for their completion. Should a specific timeframe be exceeded there is provision for recording the event as a variance from the pathway and remedial action to be instituted. The principal aim of the pathway was to maximise the effective use of resources and minimise negative patient outcomes, thereby improving patient care. As previously noted, the absence of evidence relating to the effects of clinical pathways on patient HRQoL and satisfaction led us to pose the following research questions:

When compared to standard care do patients treated under a multidisciplinary clinical pathway for fractured neck of femur:

1. Experience similar clinical outcome?
2. Achieve similar functional outcome?
3. Report reduced health related quality of life?
4. Report lower satisfaction with care?

## METHODS

### Design

We used a prospective cohort group design to compare the HRQoL, satisfaction, functional status and clinical outcome of patients who underwent surgical treatment for acute fractures of the femoral neck. This design was chosen because clinical pathways were to be introduced to the hospital for all patients with a proximal femoral fracture. Because we could not randomise patients to either a pathway or control group, we conducted a cohort study that examined the changes that resulted following the introduction of a clinical pathway for this condition on the HRQoL, satisfaction, functional status and clinical outcome of patients treated with standard care to those treated following the introduction of the clinical pathway.

### Subjects

A total of 57 patients (28 standard care and 29 pathway) were enrolled in the study. We calculated that a sample size of 52 patients would be required to detect a 20% change in the Patient Satisfaction and Perception Form (PSPF) measure with a power of 80% at a significance level of 0.05.

### Sampling

Following institutional ethics approval, patients were enrolled in the study between October 1999 and September 2000. A purposeful sampling approach was used with subjects being matched for age and comorbidity status. Patients were excluded if the fracture was caused by a malignancy, if clinically assessed as suffering from dementia or if their comprehension of English was such that they were unable to understand the questions required in the data collection instruments. A total of 101 patients were admitted to the hospital with a diagnosis of fractured neck of femur during the study period. Two patients were excluded as a result of a pathological fracture, 21 patients were excluded because of dementia. Twenty patients were not included due to unwillingness to participate or having been admitted to the hospital and subsequently having surgery during the weekend. Consequently, the final sample size of 57 subjects represents 56.4% of all potential subjects during the study period.

## Outcome measures

### *Health Related Quality of Life*

Health related quality of life (HRQoL) was measured using the Medical Outcomes Trust Health Survey Short Form 36 (SF36). The SF-36 is an internationally accepted measure of health related quality of life that has been extensively tested and validated. SF-36 normative age adjusted data are available for the Australian population. This age adjusted data set was used to compare the results from our subject population. The SF-36 was administered at three months following discharge.

### *Patient satisfaction*

The Patient Satisfaction and Perception Form (PSPF) is an instrument that was developed by the authors based on a scale reported by Williams (1994). The PSPF is comprised of four main sub-scales; 1. Information provision. 2. Involvement in decision-making. 3. Communication processes, and, 4. Treatment processes. Respondents are asked to indicate their level of satisfaction to each component on a 100mm visual analog scale with the anchor points of 0 = very dissatisfied and 100 = completely satisfied. A trial of the PSPF was conducted with a number of patients prior to this study to gain a sense of the performance of the instrument in the clinical environment. Following some modification to the PSPF to enhance its clarity it underwent further testing and validation prior to its use in this study. The PSPF reliability testing produced a Cronbach Alpha of 0.80 (n=142, $p<0.01$). The PSPF was administered at admission, discharge and three months following discharge.

### *Functional status*

The Modified Barthels Index (MBI) was developed by Shah et al (1989), it has been extensively validated and is designed to provide a rating of functional independence. The MBI is particularly useful in documenting change over time in independence or change between pre and post treatment. The MBI was measured at discharge and three months following discharge.

The Timed Up and Go (TU&G) was developed by Podsiadlo and Richardson (1991) to provide a rapid, valid and reliable measure of functional mobility in the frail elderly with comorbidities. The TU&G was recorded at discharge and three months following discharge.

### *Clinical outcome*

Clinical outcome was determined by medical record review and comprised the complications rate and type during in-patient stay and within 28 days of discharge.

## Data collection

Data collection was carried out in the period spanning September 1999 and October 2000. All functional measurements were conducted by two of the team (LK and AG) during the patient's stay in hospital and at the patient's place of residence three months following discharge. PSPF and SF36 data was primarily collected by NS and LH.

## Statistical analysis

All statistical analyses were performed with the SPSS V.9 computer program. Continuous, normally distributed data were compared using t tests for independent groups. Scores for each dimension of the SF-36 were transformed according to the SF-36 user's guide to a scale of 0-100 (100 = best possible score). These values were then compared to the Australian population norms derived by the Australian Bureau of Statistics from the 1995 National Health Survey. Where data were not normally distributed, logarithmic transformations were performed prior to analysis. Comparisons of proportions were undertaken using the z test. In all cases p values $<0.05$ were regarded as significant.

# RESULTS

Table 1 presents the demographic and clinical characteristics of the groups. Of note was the broader range of ages in the pathway group.

Table 1: Demographic characteristics of patients.

| | Standard care n=28 | Pathway n=29 |
|---|---|---|
| Median age (range) | 80 (66-89) | 79 (30-96) |
| Gender (male:female) | 8:20 | 9:20 |
| Comorbidities[1] | 2.3 | 1.7 |
| Fracture type | | |
| Sub-capital | 11 | 11 |
| Trans-cervical | 2 | 1 |
| Other | 15 | 17 |
| Prosthesis | | |
| Dynamic Hip Screw | 16 | 20 |
| Moore's | 12 | 7 |
| Other | 0 | 2 |

1. Number of clinically documented comorbidities

## Clinical and functional outcomes

Table 2 reveals that pathway patients sat out of bed and ambulated sooner and had a 3.3 day shorter length of stay (LOS) than standard care patients. The differences in the mean scores on these variables were not statistically significant at the 0.05 level. The rate of patients who developed complications during their hospitalisation was similar between the groups, although the standard care group had a higher number of complications per patient than the pathway group (2.33 versus 1.71). There was one death in each group during the study period. Both deaths were associated with other pre-existing comorbidities. No significant difference was found between the groups in

functional outcome as measured by the MBI or the timed up and go (TU&G) at discharge or at three months.

Table 2: Functional outcomes at discharge and three months.

| | Standard care (n=28) | Pathway (n=29) | p |
|---|---|---|---|
| Length of stay (days) | 14.4 | 11.1 | 0.15 |
| SOOB[1] | 74.2 | 61.9 | 0.09 |
| AMB[2] | 116.2 | 88.9 | 0.23 |
| Complications (no of pts) | 15 | 14 | 0.90 |
| Confusion | 7 | 5 | 0.67 |
| Respiratory infection | 6 | 2 | 0.20 |
| UTI | 5 | 6 | 0.96 |
| Pressure area | 6 | 3 | 0.43 |
| Wound infection | 3 | 0 | 0.25 |
| DVT | 1 | 1 | 0.48 |
| Death | 1 | 1 | 0.48 |
| Other | 6 | 6 | 0.81 |
| Total complications | 35 | 24 | 0.26 |
| MBI (discharge) | 58.1 | 67.4 | 0.12 |
| MBI (3 months) | 81.3 | 81.1 | 0.97 |
| TU&G (discharge) | 76.2 | 93.6 | 0.40 |
| TU&G (3 months) | 35.8 | 34.1 | 0.86 |

1. Time to sit out of bed (hrs), 2. Time to ambulate (hrs)

Table 3: Patient satisfaction at admission, discharge and at three months.

| | Standard care (n=28) | Pathway (n=29) | p |
|---|---|---|---|
| Information | | | |
| Admission | 186.2 | 172.2 | 0.57 |
| Discharge | 232.9 | 249.9 | 0.30 |
| 3 months | 212.4 | 175.4 | 0.23 |
| Involvement in decision making | | | |
| Admission | 51.6 | 48.8 | 0.87 |
| Discharge | 66.1 | 72.4 | 0.53 |
| 3 months | 65.7 | 34.6 | 0.01 |
| Communication | | | |
| Admission | 210.1 | 190.6 | 0.40 |
| Discharge | 241.1 | 245.6 | 0.81 |
| 3 months | 283.0 | 173.9 | 0.003 |
| Treatment | | | |
| Admission | 346.0 | 385.2 | 0.06 |
| Discharge | 444.6 | 568.6 | 0.13 |
| 3 months | 455.0 | 370.4 | 0.12 |
| PSPF sub-totals | | | |
| Admission | 792.4 | 803.8 | 0.85 |
| Discharge | 975.8 | 1133.4 | 0.12 |
| 3 months | 1012.4 | 744.0 | 0.01 |
| Total satisfaction | 2379.8 | 2466.5 | 0.67 |

### Patient satisfaction

There was no difference in the overall patient satisfaction between the groups (Table 3). When the groups were compared for each satisfaction dimension at the three measurement times, pathway patients were less satisfied at the three-month time point.

### Patients' Health Related Quality of Life

Table 4 demonstrates that HRQoL was lower than the Australian population norms for each SF-36 scale apart from the Role Limit Emotional scale in the standard care group. This scale was also significantly higher in the standard care group compared to the pathway group.

Table 4: Patient health related quality of life (SF-36) at three months following discharge.

| Dimension | Population norm[1] | Standard care | Pathway | p |
|---|---|---|---|---|
| Physical function | 53.0 | 19.3 | 23.8 | 0.49 |
| Role limit physical | 54.4 | 23.8 | 15.4 | 0.29 |
| Bodily pain | 64.4 | 39.0 | 40.0 | 0.90 |
| General health | 62.1 | 55.4 | 61.1 | 0.45 |
| Vitality | 57.5 | 40.4 | 41.9 | 0.84 |
| Social function | 76.7 | 65.9 | 54.7 | 0.24 |
| Role limit emotional | 72.2 | 81.7 | 28.3 | 0.001 |
| Mental health | 77.1 | 70.0 | 58.1 | 0.13 |

1. Australian population norm values for age 75 and over 1995.

## DISCUSSION

### *Clinical and functional outcomes*

Pathway patients sat out of bed and ambulated sooner and had a 3.3 day shorter LOS than standard care patients which was consistent with findings reported by Choong et al (2000) even though the differences in the mean scores on these variables were not statistically significant. However, we believe this result demonstrates a trend that may prove beneficial from the perspective of bed availability and cost. At an approximate cost of Aus$600 per in-patient day, a reduction of 3.3 days in LOS would represent a saving of $1,800 per patient episode. The reduced LOS in this group of patients would also increase the availability of beds for emergency and elective waiting list patients.

### *Complications*

The rate of patients who developed complications during their hospitalisation was similar between the groups, although the standard care group had a higher number of complications per patient than the pathway group (2.33 vs 1.71). The cause of this difference was not clear and we believe the finding warrants further investigation. There was one death in each group during the study period. However, both deaths were associated with pre-existing comorbidities.

### *Functional outcome*

No significant difference was found between the groups in functional outcome as measured by the MBI or the TU&G at discharge or at three months. This finding may be a consequence of both measures being sensitive at a relatively gross level. We note that at discharge pathway patients demonstrated a trend to a higher MBI score than standard care patients even though the pathway group had a 3.3 day shorter LOS.

### *Patient satisfaction*

There was no difference in the overall patient satisfaction between the groups. When the groups were compared for each satisfaction dimension at the three measurement times, pathway patients were less satisfied at the three-month time point. This result was a consequence of lower ratings by the pathway group regarding their involvement in the decision making process about their care and in the communication processes. The standard care group scores at the three measurement points demonstrated a gradual increase, whereas the pathway group recorded an increase between admission and discharge followed by a fall at three months. It is not clear why these scores had decreased in the pathway group between their discharge and the three-month point. Possible reasons for this finding include that there may have been a memory effect influencing the scores. However, if this was the case then it could be expected to be affecting both groups given their demographic similarity. Alternatively, the pathway group may have had negative experiences in the post discharge period or a slower than expected rate of recovery which may account for their lower satisfaction levels at the three month end point.

### *Patients' Health Related Quality of Life*

HRQoL was lower than the Australian population norms for each SF-36 scale apart from the Role Limit Emotional scale in the standard care group. This scale was also significantly higher in the standard care group compared to the pathway group. We note that there may be a link between the lower 'role limit emotional, scores for the pathway group and their lower satisfaction scores at three months. However, further research would be required to adequately explore the possible relationships. The HRQoL values for both groups were similar to those reported by March et al (1999) in pre-operative hip and knee arthroplasty patients. However, there is no evidence at present to suggest if the HRQoL of patients with a proximal femoral fracture will continue to improve over a period of 12 months, as did the HRQoL of patients in the March study. Overall, we conclude that whilst both groups of patients had relatively poor HRQoL there was no difference between the groups.

## LIMITATIONS

Our study was limited by a number of factors. Ideally, a randomised controlled trial design would have strengthened the study. However, this was not possible on two counts. Firstly, the clinical pathway had not been introduced and secondly, the hospital had determined that all suitable patients with a hip fracture would be treated under the clinical pathway following its introduction. The fact that we purposely omitted patients who were cognitively impaired or could not speak English introduced a degree of bias in the study.

## CONCLUSION

Based on our results, we conclude that the use of multidisciplinary clinical pathways for fractured neck of femur does not appear to adversely effect functional outcome, patient satisfaction or HRQoL. Our clinical pathway group demonstrated a decreased LOS compared to the standard care group that was not significant, yet may indicate a trend that could be important from a resource utilisation and bed availability perspective.

This is the first study that we are aware of that has investigated both patient satisfaction and quality of life as a function of treatment guided by a multidisciplinary clinical pathway for fractured neck of femur. Consequently, there is no reference point for comparison of our results or conclusions. Whilst this presents difficulties for interpretation, we believe that this study is a useful first step in the process of developing an understanding of the possible associations between the increasingly popular use of clinical pathways in the acute healthcare setting and patient satisfaction and health related quality of life.

## REFERENCES

Antioch, K., Chapman, R., Santamaria, N., Crawford, R. and Fiddes, K. 2001. Cost-effective clinical pathways at The Alfred Hospital: International lessons from Bayside Health. *Australian Health Review*. 24(4):21-29.

Australian Bureau of Statistics. 1997. National Health Survey: SF-36 population norms. Australia 1995. Canberra: ABS. (No. 4399.0).

Baudoin, C., Fardellone, P., Bean, K., Ostertag-Ezembe, A. and Hervy, F. 1996. Clinical outcomes and mortality after hip fracture: A 2-year follow-up study. *Bone*. 18(3 Suppl):149S-157S.

Choong, P.F., Langford, A.K., Dowsey, M. and Santamaria, N.M. 2000. Clinical pathways for fractured neck of femur reduces length of stay: A randomised prospective study of 111 patients. *Medical Journal of Australia*. 172(9):423-426.

Cooper, C. 1997. The crippling consequences of fractures and their impact on quality of life. *American Journal of Medicine*. 103(2A):12S-17S: Discussion 17S-19S.

Dowsey, M.M., Kilgour, M.L., Santamaria, N.M. and Choong, P.F. 1999. Clinical pathways in hip and knee arthroplasty: A prospective randomised controlled study. *Medical Journal of Australia*. 170(2):59-62.

Grudich, G. 1991. The critical path system. *American Operating Room Nurses Journal*. 53(3):705-14.

Hozak, J., Rothman, R.H., Albert, T.J. et al. 1997. Relationship of total hip arthroplasty outcomes to other orthopaedic procedures. *Clinical Orthopaedics*. 344:88-93.

Keene, G.S., Parker, M.J. and Pryor, G.A. 1993. Mortality and morbidity after hip fractures. *British Medical Journal*. 307(13):1248-50.

Kiebzak, G.M., Vain, P.A., Gregory, A.M., Morris J.G. and Mauerhan, D.R. 1997. SF-36 general health status survey to determine patient satisfaction at short-term follow-up after total hip and knee arthroplasty. *Journal of the Southern Orthopaedic Association.* 6(3):169-172.

Lavernia, C.J. 1998. Hemiarthroplasty in hip fracture care: Effects of surgical volume on short-term outcome. *Journal of Arthroplasty* 13(7):774-8.

Lieberman, J.R., Dorey, F., Shekelle, P., Schumacker, L., Kilgus, D.J., Thomas, B.J. and Finerman, G.A. 1997. Outcome after total hip arthroplasty. Comparison of a traditional disease-specific and a quality of life measurement of outcome. *Journal of Arthroplasty.* 12(6):639-645.

Lyons, A.R. 1997. Clinical outcomes and treatment of hip fractures. *American Journal of Medicine.* 103(2A):51S-63-64S.

March, L.M., Cross, M.J., Lapsley, H., Brnabic, A.J., Tribe, K.L., Bachmeier, C.J., Courtenay, B.G. and Brooks, P.M. 1999. Outcomes after hip and knee replacement surgery for osteoarthritis. A prospective cohort study comparing patients' quality of life before and after surgery with age-related population norms. *Medical Journal of Australia.* 171(5):235-238.

MacIntyre, C.R., Brook, C.W., Chandraraj, E. and Plant, A.J. 1997. Changes in bed resources and admission patterns in acute public hospitals in Victoria, 1987-1995. *Medical Journal of Australia.* 167(4):186-9.

Medical Outcomes Trust. 1994. SF-36 *Health Survey Scoring Manual for English Language Adaptations.* Australia/New Zealand, Canada, United Kingdom. Boston, MA: Medical Outcomes Trust.

Ogilvie-Harris, D.J., Botsford, D.J. and Hawker, R. 1993. Elderly patients with hip fractures: Improved outcome with the use of care maps with high quality medical and nursing protocols. *Journal of Orthopaedic Trauma.* 7(5):428-37.

Pitto, RP. 1994. The mortality and social prognosis of hip fractures. A prospective multifactorial study. *International Orthopaedics.* 18(2):109-13.

Podsiadlo, D. and Richardson, S. 1991. The timed 'up and go': A test of basic functional mobility for frail elderly persons. *Journal of the American Geriatrics Society.* 39(2):142-148.

Randell, A., Sambrook, P.N., Nguyen, T.V., Lapsley, H., Jones, G., Kelley, P.J. and Eisman, J.A. 1995. Direct clinical and welfare costs of osteoporotic fractures in elderly men and women. *Osteoporosis International.* 5(6):427-32.

Sanders, K.M., Nicholson, G.C., Ugoni, A.M., Pasco, J.A., Seeman, E. and Kotowicz, M.A. 1999. Health burden of hip and other fractures in Australia beyond 2000. *Medical Journal of Australia.* 170(10):467-470.

Schurch, M.A., Rizzoli, R., Mermillod, B., Vasey, H., Michel, J.P. and Bonjour, J.P. 1996. A prospective study on socioeconomic aspects of fracture of the proximal femur. *Journal of Bone and Mineral Research.* 11(12):1935-42.

Shah, S., Vanclay, F. and Cooper, B. 1989. Improving the sensitivity of the Barthel Index for stroke rehabilitation. *Journal of Clinical Epidemiology.* 42(8):703-9.

*SPSS Base 9 for Windows.* SPSS Inc. Chicago, Ill.

Swanson, C.E., Day, GA., Yelland, C.E., Broom, J.R., Massey, L., Richardson, H.R., Dimitri, K. and Marsh, A. 1998. The management of elderly patients with femoral fractures. A randomised controlled trial of early intervention versus standard care. *Medical Journal of Australia.* 169(10):515-8.

Tallis, G. and Balla, J.I. 1995. Critical path analysis for the management of fractured neck of femur. *Australian Journal of Public Health.* 19(2):155-9.

Wigfield, A. and Boon, E. 1996. Critical pathway development: The way forward. *British Journal of Nursing.* 5(12):732-35.