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DETERMINANTS OF PRE-PROCEDURAL STATE ANXIETY AND NEGATIVE AFFECT IN FIRST-TIME COLPOSCOPY PATIENTS: IMPLICATIONS FOR INTERVENTION

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Abstract

Women experience significant emotional distress in relation to further diagnostic evaluation of pre-cancerous cell changes of the cervix. However, less is known about the specific variables that contribute to elevated state anxiety and negative affect prior to colposcopy. The study aims to identify psychosocial factors that predict distress in this patient group, which can help in the development of more sophisticated interventions to reduce psychological distress. Socio-demographic variables, scores for state anxiety, negative affect, trait anxiety, fear of pain, coping style, pain-related expectancy and knowledge were assessed in 164 first-time colposcopy patients immediately before the colposcopy examination. Twenty-six per cent of variance in pre-colposcopy state anxiety was significantly explained by marital status, parity, trait anxiety, fear of minor pain and expectations of discomfort. Twenty-nine per cent of variance in pre-colposcopy negative affect was significantly explained by trait anxiety and expectations of pain. Women who are single, have children, are high trait anxious, and anticipate pain and discomfort appear to be at risk for pre-colposcopy distress. Interventions aimed at reducing pre-colposcopy psychological distress should include situation-specific variables that are amenable to change, and trait anxious women are likely to benefit from interventions to reduce distress.

Key words: Colposcopy, anxiety, negative affect, cervical screening, psychology

Introduction

Cervical cancer is a serious health threat to women; it is the second most common cancer in women worldwide, and one of the most common malignancies in women under the age of 40 (Horner et al., 2009). Cytological screening by smear test allows for early detection of pre-cancerous lesions and treatment, which may stop the progression from cervical intraepithelial neoplasia (CIN) to invasive cervical cancer.

Receipt of an abnormal smear test is generally followed by referral for colposcopy, a diagnostic technique that allows for in-situ examination of the cervix. Referral for colposcopy is associated with significant patient distress and heightened state anxiety (e.g., Marteau et al., 1990). However, the specific variables that contribute to elevated state anxiety remain unclear. Women who experience heightened state anxiety prior to colposcopy may be at greater risk for pain and complications during the examination (Ludwick-Rosenthal and Neufeld, 1988). In addition, elevated anxiety and its consequences may reduce adherence to screening procedures and adequate follow-up treatment for abnormal smear test results (French et al., 2004).

Elucidation of the variables that contribute to elevations in state anxiety would therefore have important theoretical and treatment implications for women undergoing cervical cancer screening, including the possibility of being able to identify particularly vulnerable subgroups of women at risk for heightened state anxiety. Secondly, identifying variables that predict anxiety in relation to colposcopy can assist in the development of more sophisticated strategies to reduce anxiety levels.

The role of psychosocial factors in predicting pre-colposcopy anxiety has only been examined in one study (Hellsten et al., 2007). Of the variables under consideration,

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depression scores and referral letter citing 'some changes' emerged as the only significant predictors of pre-colposcopy state anxiety. Another study comparing state anxiety scores in women scheduled for colposcopy found greater state anxiety in women without a partner, women who experience the waiting time as long, and women who were dissatisfied with the pre-colposcopy information they had received (Bekkers et al., 2002). These studies, however, failed to assess other important factors that are known to influence anxiety in women scheduled for colposcopy.

For example, women are as concerned with the prospect of the colposcopy procedure itself, as the diagnostic outcome (Marteau et al., 1990). The colposcopy-related concerns have been considered to be due to uncertainty and lack of knowledge about cervical cancer screening and colposcopy (e.g., Freeman-Wang and Walker, 2005). However, due to mixed findings from previous studies (Pruitt et al., 2005, Brooks et al., 2002), it is not clear to what extent prior knowledge of cervical cancer screening is associated with pre-colposcopy anxiety.

Women's concerns also include whether the examination will be painful and/or uncomfortable (Marteau et al., 1990, Neale et al., 2003). Expectation of pain is associated with greater anxiety in dental patients (Arntz et al., 1990), and in minor surgery patients (Terry et al., 2007). However, the extent to which these concerns contribute to anxiety levels in women scheduled for colposcopy is presently not known. Additionally, pain and discomfort associated with medical procedures may be mediated by fear of pain (Bradley et al., 2008). Fear of pain refers to trait-like fear responses to painful situations, and is a key component in medical fears (McNeil and Berryman, 1989), and may also influence adherence to cancer screening (Denberg et al., 2005).

Furthermore, as fear of pain is related to anxiety (Roelofs et al., 2005), we were also interested in examining the effect of trait anxiety in this context. While state anxiety is temporary and varies in intensity and over time, trait anxiety is considered a stable personality characteristic. Trait anxious individuals tend to respond to stressful situations with increases in state anxiety, and the higher the levels of trait anxiety, the more likely it is that an individual will experience anxiety in variety of situations, relative to individuals low in trait anxiety (Spielberger et al., 1983). Given the strong relationship between state and trait anxiety, it is surprising that previous studies have failed to control for the effects of an underlying anxious disposition on pre-colposcopy state anxiety levels. Finally, coping style represents an important mediator between stressor and psychological outcome (van Zuuren et al., 1999). Monitoring coping style refer to individual's habitual ways of cognitively dealing with stressful medical situations. It has been found to influence anxiety in relation to medical procedures, with high monitors reporting greater anxiety than low monitors (Miller et al., 1994, Miller et al., 1993).

The aim of the present study was to identify psychosocial factors influencing state anxiety and negative affect in a sample of women who attend for their first colposcopy examination. Factors that are amenable to change were of particular interest, as knowledge of modifiable variables associated with pre-colposcopy distress could aid in the design of interventions.

Method

Participants

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One hundred and sixty four consecutive patients (*M* age = 30.20 years, *SD* = 8.66) were recruited from a colposcopy clinic in a university teaching hospital in Ireland as part of a study assessing intra-procedural interventions. Women were eligible for inclusion in the study if they were first-time patients, having been referred with an abnormal cervical smear result. Exclusion criteria were age less than 18 years, history of severe cardiac, pulmonary, or liver disease, epilepsy and current chronic pain, to ensure a relatively healthy sample without any co-morbid disease; this information was obtained by a self-report checklist.

Design

A cross-sectional questionnaire design was used, with women assessed prior to their first ever colposcopy examination. The criterion variables were scores for pre-colposcopy state anxiety and negative affect. The predictor variables were socio-demographic variables, and scores for trait anxiety, fear of pain, monitoring coping style, knowledge, pain expectancy, and discomfort expectancy. All procedures were reviewed and approved by the Research Ethics Committee of the local university hospital.

Measures

Demographic Information

The background self-report information elicited included age, marital status, education, parity and time waiting for appointment. From the medical charts, objective waiting time and grade of the referral smear were extracted.

Cervical Cancer Screening Knowledge Questionnaire

This 25-item measure, derived from the literature (Hughes, 2001, Lamb, 2000) was used to assess patients' understanding of the cervical cancer screening. The items covered areas such as knowledge of cervical abnormality symptoms, and implications of receiving a normal and abnormal smear test result. Colposcopy-related items included knowledge of the examination itself and possible diagnosis. Each item was followed by a number of statements, and women were required to indicate whether the statements were true or false. A response category of "don't know" was also included. The scores range from 0 – 25. Cronbach's alpha for the scale was .86.

State-Trait Anxiety Inventory (STAI)

To assess women's state (present moment) and trait (in general) anxiety levels, the STAI (Spielberger et al., 1983) was used. Each scale consists of 20 items and is measured on a four-point scale ranging from "not at all" to "very much". The possible range of scores for each scale is 20 - 80. Reliability and validity of this scale has been established (Spielberger et al., 1983). Cronbach's alpha was .93 for the state scale, and .89 for the trait scale.

The Positive and Negative Affect Schedule (PANAS)

To assess mood, the PANAS (Watson et al., 1988) was administered. The scale consists of 10 positive and 10 negative adjectives used to describe different feelings and emotions. Respondents are required to rate "the extent to which they feel this way right now, that is, at the present moment" on a five-point scale from "very slightly, or not at

all" to "extremely". The possible range of scores for each scale is 10 – 50. Reliability has been established (Crawford and Henry, 2004, Watson et al., 1988). Cronbach's alpha was .85 for the PA scale, and .84 for the NA scale.

Expectations of pain and pain unpleasantness

Expectations of pain and pain unpleasantness during the colposcopy were assessed using two 100-mm visual analogue scales (VAS). The pain intensity VAS was anchored by "no pain" and "pain as bad as it could be", while the pain unpleasantness VAS was anchored by "no discomfort" and "worst discomfort" at either end. To score a VAS the distance from the "no pain/no discomfort" anchor to the respondent's mark is measured, such that a higher score indicates greater expectation of pain or pain unpleasantness. VASs measuring pain intensity and pain-related affect have demonstrated good test-retest reliability (Price et al., 2001), and convergent validity has been established (Jensen and Karoly, 2001, Jensen et al., 1986).

Fear of Pain Questionnaire - III

This 30-item questionnaire assesses how fearful patients are of pain (McNeil and Rainwater, 1998). The respondent has to rate the degree of fear they anticipate experiencing in relation to each painful experience, on a 5-point scale from "not at all" to "extreme". The FPQ-III consists of three sub-scales: minor pain, severe pain, and medical pain, and each subscale can be scored to yield a range of 10-50.

Reliability and validity have been established (McNeil and Rainwater, 1998, Roelofs et al., 2005). The minor and medical subscales were chosen for inclusion in the

analyses, given the relatively minor nature of the colposcopy examination (Cronbach's alpha for each scale .88).

Miller Behavioral Style Scale (MBSS)

To assess monitoring coping style the MBSS was used (Miller, 1987). It contains four threatening, uncontrollable hypothetical scenarios, each followed by eight statements, where half relates to high monitoring coping style, and half to low monitoring coping style (blunting). The MBSS yields both a total high monitoring score and a total low monitoring (blunting) score, and each scale has a possible range of scores between 0-16. Test-retest reliability and discriminant validity have been established (Miller, 1987, Miller et al., 1988). Cronbach's alpha in the present sample was .69.

Procedure

Patients were initially interviewed by a nurse, and were subsequently requested to wait in a designated waiting area. Women presenting for first-time colposcopy were invited to take part in the study, and written consent was obtained. Each woman was administered the study questionnaires immediately before the colposcopy examination, and individually responded to them in a quiet office with the researcher present to answer any questions.

Statistical analysis

A series of hierarchical multiple regression analyses were conducted, with state anxiety and negative affect as the dependent variables in their respective models. Socio-

demographic variables were entered at the first step, followed by the individual differences variables (trait anxiety, monitoring coping style, fear of pain) at the second step. This procedure enables the examination of the unique contribution of the personality variables to emotion after controlling for background variables, and permits assessment of the ability of the personality variables to mediate the effects of background variables. At the third step of the regression, expectations of pain and discomfort, and knowledge scores were entered.

Results

One hundred and sixty-four women participated in the study however, missing values on the FPQ-III questionnaire resulted in 150 women available for analyses. There were no differences between women who did or did not respond to the FPQ on any of the demographic variables, or pre-colposcopy distress variables, all ps > .05. However, women with incomplete FPQ-III questionnaires had lower knowledge scores ($M = 11.07$, $SD = 4.75$) than women with complete data ($M = 14.36$, $SD = 5.28$), $t(162) = 2.25$, $p = .026$. See Table 1 for mean values of the psychosocial variables.

The patient estimates of waiting time for the colposcopy appointment was correlated with the information recorded in the medical charts ($r = .41$, $p < .001$), thus, it was considered appropriate to use the information from the medical charts.

Insert Table 1 about here

Correlates of state anxiety and negative affect

Pearson's product moment correlations were calculated to explore the bivariate association between the psychosocial variables and pre-colposcopy state anxiety and negative affect (see Table 2).

Insert Table 2 about here

Multivariate predictors of state anxiety

The results of the multiple regression analysis for state anxiety are presented in Table 3. Demographic variables accounted for a small but significant percentage of variance in anxiety. Women who were single and had children, reported higher levels of pre-colposcopy state anxiety. The individual difference variables of trait anxiety, fear of pain and monitoring coping style accounted for 12% additional variance in state anxiety. Marital status and parity retained significant beta values. Trait anxiety (β = .28) and fear of medical pain (β = .24) were significantly and positively associated with state anxiety (p < .01). Fear of minor pain was inversely associated with state anxiety (β = -.27, p < .05).

The inclusion of the situation-specific variables (knowledge, expectations of discomfort and pain) produced a significant increase in the explained variance in state anxiety by 10%. Marital status and parity retained significant beta values, implying that they were independently associated with state anxiety. Trait anxiety and fear of minor pain retained significant beta values, while fear of medical pain was rendered non-

significant after the inclusion of the situation-specific variables. Expectations of discomfort was the only factor to add significantly to the variance explained (β = .21, p < .05). The overall model was significant, explaining 26% of variance in pre-colposcopy state anxiety in total.

Insert Table 3 about here

Multivariate predictors of negative affect

The results of the multiple regression analysis for negative affect are presented in Table 4. The demographic variables explained a small, and overall non-significant, percentage of variance in negative affect. Marital status was the only individual variable with a significant beta value. The inclusion of individual difference variables explained an additional 14% of the variance. The effects of marital status were reduced to non-significance by the inclusion of trait anxiety, fear of pain and monitoring coping style. Trait anxiety (β = .31) and fear of medical pain (β = .24) were positively and significantly associated with negative affect (p < .05).

The inclusion of the situation-specific variables explained an additional 15% of the variance in negative affect. Trait anxiety retained a significant beta value, indicating that high trait anxious women are at greater risk of experiencing higher negative affect, regardless of other more specific factors. Fear of medical pain was rendered non-significant in the final model. Expectations of pain were positively and significantly

associated with negative affect ($\beta = .34$, $p < .001$). The final model was significant, and explained 29% of variance in pre-colposcopy negative affect in total.

Insert Table 4 about here

Discussion

The present study aimed to examine predictors of anticipatory state anxiety and negative affect in a sample of women who attended for their first colposcopy due to abnormal cervical smear test results. Women experienced high levels of state anxiety ($M = 45.31$, $SD = 12.23$) prior to colposcopy, which represents the 81st percentile in working women aged 19-49 years (Spielberger et al., 1983). This is in line with similarly high levels reported in other studies (Bekkers et al., 2002, Richardson et al., 1996, Howells et al., 1999). Women also reported high negative affect, the mean score of 18.08 ($SD = 6.13$), represents the 74th percentile in 'normal' adults (Crawford and Henry, 2004). The findings indicated that women's pre-colposcopy state anxiety levels were influenced by their marital status, whether or not they had children, trait anxiety, fear of minor pain, and expectations of discomfort during colposcopy. In addition, pre-colposcopy negative affect was influenced by women's trait anxiety scores and expectations of pain during colposcopy.

Women who were single reported greater state anxiety than married women, and women who had children reported greater state anxiety than women without children. These variables were unaffected by the inclusion of the other variables in the regression

model, suggesting that these are independently associated with pre-colposcopy distress. Thus, women with a partner reported significantly lower state anxiety than women without a partner, which is in line with previous research (Bekkers et al., 2002), but contrary to another study (Hellsten et al., 2007). It is possible that having a partner acts a protective factor, as it provides social support, which acts as a buffer against negative psychological reactions to a stressful medical procedure like colposcopy (Tiersma et al., 2004).

Women with children experienced greater state anxiety, contrary to the findings of other studies (Bekkers et al., 2002, Hellsten et al., 2007). The reasons for these differences are not presently known, but may be linked to fertility-related concerns (family not complete) or family-related concerns (concerns over leaving children behind). In a retrospective study, women with fertility-related concerns were found to report significantly more anxiety in relation to colposcopy than women without such concerns (Kola and Walsh, 2009). A review study of fertility-related concerns in younger women with breast cancer revealed that women who had not yet completed their families had greater such concerns (Peate et al., 2009). Consistent with peak incidence of CIN between the ages 25-35 (Parkin et al., 2001), the sample consisted of mainly younger women (M age = 30.15, SD = 8.61). It has been suggested that younger women commonly juggle multiple role demands, and that these cause younger women to be particularly vulnerable to psychosocial morbidity when faced with the diagnosis of a life-threatening disease (Bloom and Kessler, 1994). In other words, women who are mothers may experience more role demands than women without children, resulting in heightened anxiety when faced with colposcopy, which may be linked to fear of cancer. Women who

fear cancer report heightened anxiety levels, relative to women who do not fear they have cancer (Kola and Walsh, 2009). For women with children, it can be speculated that heightened anxiety levels may be linked to a fear of cancer and perceived uncertainty over the future, although this remains to be empirically demonstrated, and thus warrants further investigation.

Trait anxiety was an independent predictor of both state anxiety and negative affect. This finding is not surprising, as trait anxious individuals react to stressful events with heightened state anxiety, and the higher the levels of trait anxiety, the more likely it is that an individual will experience anxiety in different situations, compared with individuals who are low in trait anxiety (Rachman, 2004, Spielberger et al., 1983). Consequently, women who are high in trait anxiety may represent a particularly vulnerable subgroup of patients.

Fear of medical pain was positively associated with state anxiety and negative affect at stage two of each regression analysis. However, the inclusion of anticipated pain and discomfort rendered fear of medical pain non-significant in both analyses, which suggests that expectations of pain and discomfort were better predictors of pre-colposcopy distress. Minor pain was inversely associated with state anxiety, and remained a significant predictor in the final model. Thus, women who scored lower on the fear of minor pain subscale reported greater anxiety. It has been suggested that minor fear of pain as measured by the FPQ is most sensitive in assessing individual differences in fear of pain in relation to pain intensity (Roelofs et al., 2005). However, it is not presently known why an inverse relationship was found between minor fear of pain and pre-colposcopy state anxiety, and this requires further study.

Pain expectancies were associated with pre-colpscopy distress. Expectations of what will occur in a given event have been shown to influence subsequent reactions to it. Therefore, pain expectancies may function as unconditioned stimuli for negative emotional states such as anxiety (Jacobsen et al., 1993, Kirsch, 1985). In other words, expecting pain evokes a natural, negative response. With regard to anticipatory psychological distress, women who expect colposcopy to result in pain and discomfort are more likely to experience anxiety and negative affect before first-ever colposcopy. To our knowledge, this is the first time pain-related expectancies have been empirically associated with anticipatory anxiety in women awaiting colposcopy.

Monitoring coping style, although correlated with state anxiety scores, did not emerge as an independent predictor of pre-colposcopy state anxiety, contrary to previous findings (Miller et al., 1994, MacLaren and Kain, 2008). Thus, the results from this study suggests that dispositional coping style may be a weak predictor of emotional outcomes following inclusion of higher-order personality traits (Knoll et al., 2005, McCrae and Costa, 1986).

As only 26% of the variance in pre-colposcopy state anxiety and only 29% of the variance in pre-colposcopy negative affect was explained by the biopsychosocial variables in the present study, it is further testament to the difficulty in identifying variables that are associated with anticipatory medical distress (Gerdes and Guidi, 1987, Heaton et al., 2007, Nijkamp et al., 2004). The findings from this study are limited by the cross-sectional design, which can only establish that relationships exist between two or more variables, but cannot establish causality. However, the findings from the present study inform in establishing priorities for controlled experimental intervention studies.

The parameters of this study did not allow for assessment of women who received invitation to colposcopy following an abnormal smear test but did not adhere to the treatment advice. Thus, no information is available regarding the representativeness of the sample to other women outside of the time period study who received abnormal smear test result and did not attend colposcopy. Nevertheless, the sample in the present study was similar to that of others reported in the literature (Le et al., 2006, Jones et al., 1996).

The strengths of the study include a large sample size, and previous experience of colposcopy is not a confounding variable, as all women in the study were first time patients. In addition, all women were assessed just prior to their colposcopy examination. In summary, the results of this study suggest that trait anxious individuals may represent a particularly vulnerable subgroup of women, prone to experience heightened psychological distress prior to colposcopy. Effective methods for reducing anticipatory anxiety in this patient group should be identified.

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TABLE 1. **Mean (*SD*) psychosocial variables of study participants (*n* = 150)**

Variable	Mean (SD)
Age	30.15 (8.61)
Referral smear grade	
Inadequate n (%)	25 (16)
Borderline Nuclear Abnormalities (Squamous) n (%)	18 (12)
Mild dyskariosis n (%)	57 (38)
Moderate dyskariosis n (%)	31 (21)
Severe dyskariosis n (%)	19 (13)
Marital status	
Married/Living as married n (%)	56 (63)
Single/divorced/widowed n (%)	94 (37)
Parity	
Have children n (%)	73 (51)
No children n (%)	77 (49)
Education	
Tertiary education n (%)	86 (57)
Less than tertiary education n (%)	64 (43)
Waiting time	7.91 (3.48)
STAI State	45.31 (12.23)
STAI Trait	35.63 (7.93)
PANAS NA	18.08 (6.13)

PANAS PA	27.53 (7.66)
FPQ minor pain	21.21 (6.56)
FPQ medical pain	26.91 (7.59)
MBSS	8.21 (2.96)
Knowledge	14.36 (5.28)
Expectation of discomfort	47.23 (23.83)
Expectation of pain	37.12 (25.36)

TABLE 2. **Bivariate correlations between the predictors and dependent variables pre-colposcopy state anxiety and negative affect ($n = 150$)**

Variable	1	2	3	4	5	6	7	8	9
1.State anxiety									
2. Negative affect	.76**								
3.Positive affect	-.39**	-.18*							
4.Trait anxiety	.26**	.32**	-.27**						
5 Fear of minor pain	-.07	.11	.15	.19*					
6. Fear of medical pain	.14	.24**	-.03	.11	.58**				
7. Monitoring style	.16*	.14	-.01	.13	-.09	-.03			
8. Total knowledge	.12	.02	-.15	.01	-.20*	-.10	.24**		
9. Expectation of discomfort	.39**	.40**	-.12	.08	.05	.31**	-.02	.12	
10. Expectation of pain	.36**	.46**	.03	.12	.15	.34**	-.07	-.06	.71**

* $p < .05$

** $p < .01$

TABLE 3. Hierarchical multiple regression analysis for predictors of pre-colposcopy state anxiety

Step	Variable	β	ΔR^2	Adjusted ΔR^2	F-change
1	Age	.03			
	Single v. married	-.17*			
	No children v. children	.20*			
	Less than tertiary v tertiary education	.07			
	All other smear grades v. high grade	.09			
	Waiting Time	-.10	.11	.07	2.80*
2	Trait Anxiety	.25**			
	Fear of minor pain	-.22*			
	Fear of medical pain	.09			
	Monitoring style	.09	.12	.10	5.31**
3	Knowledge	.06			
	Expectations of discomfort	.21*			
	Expectations of pain	.18	.10	.09	6.84**

Total $R^2 = .33$, adjusted $R^2 = .26$

* $p<.05$, ** $p<.01$.

TABLE 4. Hierarchical multiple regression analysis for predictors of pre-colposcopy negative affect

Step	Variable	β	ΔR^2	Adjusted ΔR^2	F-change
1	Age	-.06			
	Single v. married	-.12			
	No children v. children	.16			
	Less than tertiary v tertiary education	.06			
	All other smear grades v. high grade	.02			
	Waiting Time	-.10	.06	.02	1.51
2	Trait Anxiety	.27**			
	Fear of minor pain	-.04			
	Fear of medical pain	.06			
	Monitoring style	.07	.13	.12	6.01**
3	Knowledge	.02			
	Expectations of discomfort	.12			
	Expectations of pain	.34**	.15	.14	10.63**

Total R^2 = .35, adjusted R^2 = .29

* p<.05 , ** p<.01.