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Factors Related To Depressed Mood in Adults with COPD Post-Hospitalization

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Abstract

This study examined factors that predict depressed mood at discharge and 3-months post-discharge for 124 elders with chronic obstructive pulmonary disease (COPD). After controlling for physiological status (FEV₁% predicted), the factors of anxiety, perceived health competence (PHC), daily functioning, and family emotional coping (FEC) predicted depressed mood. Discharge referrals for homecare services could be used to assess the four factors with the potential for the health care team to intervene. Interventions could include anxiety reduction through music or other therapies, education to enhance perceived health competence, oxygen use with activities to improve functioning, and integrating informal caregiving support from the community to increase family emotional support.

Keywords

anxiety; depressed mood; perceived health competence; family support; COPD

There is a large body of research relating chronic illness and depression, with repeated studies suggesting that individuals with chronic obstructive pulmonary disease (COPD) have a higher than normal prevalence of depression (Kunik et al., 2005; Norwood, 2006). An estimated 13 million adults lived with COPD in the United States in 2006 and depression afflicted approximately half of COPD patients compared to all patients in general (Pleis & Lethbridge-Cejku, 2007). The factors that can produce or exacerbate depression are of concern (Mikkelsen, Middelboe, Pisinger, & Stage, 2004). Risk factors for depression can be helpful in identifying depressed mood the outcome for the current study. However, evidence of COPD-related risk factors that predict depressed mood after hospital discharge are inconclusive. Identifying risk factors for depressed mood in COPD patients could increase the likelihood of appropriate intervention orders prior to hospital discharge. Home healthcare services could follow-up after discharge to provide early treatment of the depressed mood symptoms and eliminate or reduce negative consequences such as rehospitalization.

Purpose and Literature Review

The fact that patients with COPD experience *depression/depressive symptoms* has been supported in several studies (Cully et al., 2006; Kessler et al., 2006). Commonly seen in chronically ill people, depressed mood, although not a psychopathologic disorder, represents a state of negative and distressed mind (Martin, 2002). In a study by Weaver, Narsavage and Guilfoyle (1998), depressed mood was measured by the frequency of the presence of symptoms

such as feeling blue. Depressed mood may decrease functioning and worsen COPD symptoms, including breathlessness. Depressed mood has been related to poor health outcomes in COPD patients, with suggestions that depressed mood increased with *disease severity* (i.e., *Forced Expiratory Volume in 1 second -FEV₁%* and *dyspnea*), functional disability, *anxiety*, and less supportive resources (Gudmundsson et al., 2005; Langa et al., 2002).

Using a multinational sample to identify the patients' perspective, Kessler et al. (2006) discovered that after episodes of COPD exacerbation, patients experienced increased anxiety with worry about the next exacerbation; had impaired *daily functioning* that required additional assistance; and had increased negative feelings that affected their family. Taking care of a family member diagnosed with COPD increased the burden on the family even when formal caregivers (e.g., homecare clinicians) were used (Langa et al., 2002). Leung et al. (2007) demonstrated the buffering effects of *family support*, especially emotional support, for elders with chronic diseases.

Perceived health competence (PHC), an intrinsic personality component of perceived control viewed as global self-efficacy, is an innovative defined variable for the current study. PHC indicates self-confidence about one's ability to manage health behavior and attain health goals (Smith, Wallston, & Smith, 1995). In an intervention study, Sinclair and colleagues (1998) demonstrated that higher levels of perceived control positively affected coping behavior, psychological well-being, and ability to function with chronic disease. Similarly, patients with lower PHC had poorer health status with less confidence in their ability to impact health outcomes. An association between lower PHC and depressed mood in patients with COPD would follow logically. Depressed mood, in turn, may contribute to development of depression, disease progression and deterioration of an individual's quality of life (Cully et al., 2006). Little research with PHC as it relates to outcome measures (e.g., depression) has been completed. The rationale for limiting this study to depressed mood is that depression is complex and the measurement of clinical depression with this population is limited and usually occurs over months to years, often following manifestation of depressed mood with worsening symptoms. Identifying risk factors for depressed mood can be completed within the "highest risk" time frame for rehospitalization - the first 3 months after discharge (Narsavage & Naylor, 2000). The purpose of this study was to identify predictors of depressed mood, which, in turn, could identify those individuals at risk for developing depression. The literature suggested that factors of physiological status (FEV₁%), dyspnea, PHC, anxiety, daily functioning, and family emotional coping (FEC) may affect depressed mood at discharge and at three months post-discharge for patients with COPD.

Methodology

Conceptual Framework

Roy's adaptation Model (1991) provided the framework for this study (see Figure 1). Roy suggests that humans are biopsychosocial adaptive systems who cope with environmental change through four subsystems: physiologic needs, self-concept, role function, and interdependence. In this study, COPD patients discharged from a hospital were viewed as the individuals under stress (input stimulus). For this study, nursing assessment identified factors that help a person adapt to the stress of discharge in physiological, self-concept, and interdependence modes. Role function was not included as all patients had limitations in role function related to being hospitalized.

The three modes could affect outcomes in depressed mood over time (Narsavage & Naylor, 2000). Physiological status was measured by common indicators of severity of COPD (FEV₁%) and dyspnea level. PHC and anxiety were categorized within the self-concept mode and daily functioning and FEC were considered in the interdependence mode. Depressed mood

at the time of discharge and three months post-discharge (time to stabilize/rehospitalize) after initial hospitalization was considered an indicator of poor adaptation to COPD. The patient's level of adaptation (depressed mood) was examined as a response to the stress-adaptive modes. If patients fail to successfully adapt to stressful stimuli (COPD discharge), depressed mood may occur and result in a negative feedback loop leading to exacerbation and rehospitalization. Thus, by recognizing the stimuli affecting (mal) adaptation, a nursing intervention could enhance adaptive behaviors and avoid or decrease depressed mood (Roy & Andrews, 1991).

Design

This secondary analysis was based on a longitudinal, predictive study of COPD patients who were discharged in 1997 following hospitalizations for exacerbation of their lung disease (Narsavage & Naylor, 2000). IRB approval supported review of admissions to identify eligible patients (COPD diagnosis and at least 50 years of age) within 24 hours of admission. Patients were individually contacted by the primary investigator or clinical research nurse within 48 hours of admission. Following informed consent obtained in the hospital, data were collected in the patient's home during a visit within 48 hours of hospital discharge and at 3-months post-hospitalization by the clinical research nurse or primary investigator. Demographic data of age, gender, and race were collected at entry into the study via patient records. A portable computerized spirometer was used in the home to measure FEV₁. Other independent variables, including dyspnea, Personal Health Competency, anxiety, daily functioning, and depressed mood were self-reported by patients and evaluated at discharge and 3 months after discharge. The family was interviewed at home for the Family Coping Estimate at discharge and 3 months after discharge.

Sample

A convenience sample of 124 participants that were discharged from five community hospitals after treatment of their COPD exacerbation constituted the study group. Of the subjects, 65 were females and 59 males, with an average age of 73.4 ($\pm$ SD 8.9) years; the majority were Caucasian due to the demographics of the region under study (3 % non-white). The participation rate was 65% of eligible patients. Almost 80% had been referred for home care at discharge. The baseline mean FEV₁ and FEV₁% predicted for the study group was low (0.92 ± 0.5 L; $38.3 \pm 18.6\%$, respectively) with moderate dyspnea levels ($M \pm SD = 5.49 \pm 2.5$; range = 0–9). The health competence mean (27.6 ± 6.4) and the average anxiety level (35.9 ± 15.3 ; range 1–60; higher score = lower anxiety) were moderate. Depressed mood states did not vary significantly over time from hospital discharge to living at home: 39 ± 13.2 (range 3–60; median 40) at discharge and 40 ± 14.3 (median 44) at 3-month post-hospitalization.

Instruments

After controlling for physiological status/disease severity (FEV₁% predicted), the five independent variables of dyspnea, Personal Health Competence (PHC), anxiety, daily functioning and family emotional coping were examined as they related to the outcome variable, depressed mood. Dyspnea was assessed using the Numeric Rating Scale (NRS) (Gift and Narsavage, 1998); daily functioning and anxiety were measured by the subscales of the Pulmonary Functional Status Scale (PFSS) (Weaver et al., 1998); PHC was evaluated by the Perceived Health Competence Scale (PHCS) (Smith et al., 1995), and family emotional coping was one-item of the Family Coping Estimate (FCE) (Freeman & Heinrich, 1981). Depressed mood was based on a separate subscale of the PFSS. The instruments used in the study are summarized in Table 1.

Physiological status/disease severity was measured using a Microlab 3100 portable spirometer (Micro Medical Ltd., 1994) by the value of FEV₁% predicted. "The forced expiratory volume (FEV₁) is the volume of gas exhaled in one second by a forced expiration from full

inspiration” (West, 2007, p.4). The American Thoracic Society recommends using FEV₁% predicted as a basis for staging patients with COPD. Stage I (mild) COPD includes patients with an FEV₁> 49% of the predicted value, whereas Stage II, (moderate) FEV₁ is 35% to 49% of the predicted value and Stage III (severe) FEV₁ is <35% of the predicted value (American Thoracic Society, 1995).

Dyspnea was assessed using the Numeric Rating Scale (NRS) (Gift and Narsavage, 1998). The NRS for dyspnea is often implemented clinically to measure the level of breathlessness with rating from 0 (no shortness of breath) to 10 (worst shortness of breath). Patients were asked to complete a self-report of their difficulty in breathing at the time of data collection.

The PFSS measures the daily activities/social functioning, psychological functioning, and the sexual impact of COPD (Weaver et al., 1998). It contains 35 items that assess the ability and degree of difficulty with general daily performance and functioning in patients with lung disease. The lower the overall total score on this scale the greater the impact of COPD; the higher the score, the better the function. Using the PFSS, daily functioning was measured by the 15-item Daily Activities Functioning subscale. Anxiety was self-reported by another subscale of Psychological Functioning. For the anxiety subscale, the higher the score, the lower the anxiety.

High validity and reliability of the PFSS were established by Narsavage and Weaver (1994). The subscales are independent of each other and thus could be used individually with acceptable to high reliability (Cronbach’s $\alpha = .86-.93$).

The Personal Health competence Scale (PHCS) measured a personality factor that could influence depressed mood. As a global measure of self-efficacy, individuals with high personal health competence perceive that they can “control” their health (Smith et al., 1995). The PHCS includes eight-items that measure individuals’ expectation of control of factors related to health (range 10–40). Construct validity and internal consistency of the PHCS were demonstrated in a previous study with alpha coefficients ranging from .82 to .90 (Smith et al., 1995). The reliability in this study was acceptable at .78.

The Family Coping Estimate, a 9-item Likert type scale, measures the coping capacity of the family based on nine questions ranging from “1= poor coping” to “5= excellent coping” (Freeman & Heinrich, 1981). Clinical use of the FCE is based on identifying improvement from admission to discharge from home care services; the higher the score, the better the coping in clinical practice. Our study had a mean of 36.7(*SD* 5.1) with a total score range of 23–45 (instrument range 9–45). Internal consistency was .75. Family coping in emotional situations was of greatest concern in this study because it was the situational item of the FCE that had a similar relationship strength with outcomes at discharge and three months after discharge ($r = .35$ at discharge & $.41$ 3-months post discharge, $p < .001$). This specific question focuses on the degree of family’s ability to adapt to stress and negative life situations.

Depressed mood, a separate component of pulmonary functional status, was measured using 5-specific questions modified from the Arthritis Impact Measurement Scales (AIMS) (Meenan, Gertman, & Mason, 1980). Questions asked how frequently the patient has experienced feeling: “down or blue, better off if dead, in low spirits, that nothing could cheer them, and that nothing turns out as they want.” The lower the overall score, the greater the depressed mood.

Statistical Analyses

Descriptive statistics were used to describe sample characteristics. Relationships between the variables and the outcome of depressed mood were evaluated using Pearson Correlations. Multiple regression analyses, controlling for physiological status (FEV₁% pred.), were used

to determine predictors of depressed mood at discharge and 3 months. Significance was set at .05.

Results and Discussion of Findings

1. Most variables in the study were significantly related to depressed mood at discharge and 3 months post-discharge (see Table 2) but were not highly related to each other. Age and gender were not related to depressed mood.
2. There were little to moderate relationships of personal health competence, anxiety, daily functioning, and family emotional coping with depressed mood at discharge and 3 months. That is, depressed mood was associated with low perceived health competence, high anxiety, poor daily functioning, and low family emotional coping.
3. Dyspnea, although statistically significant at discharge ($p < .05$), showed a weak relationship to depressed mood but was not significant at 3 months post-discharge.
4. Emotional coping was a significant predictor of the patient's level of depressed mood at 3 months post-discharge.
5. The regression analysis identified the risk factors that predicted depressed mood at discharge. After controlling for physiological status (FEV₁% pred.) at hospital discharge, the model found that 46.6% of the variance in depressed mood was explained by anxiety and personal health competence at discharge ($p < .05$; see Table 3). The other variables of dyspnea, daily functioning, and family's emotional coping did not add to the prediction of depressed mood at discharge.
6. At 3 months after discharge 45.4% of the variation in depressed mood was explained by daily functioning, personal health competence, family emotional coping, and patient anxiety after adjusting for disease severity as determined by the FEV₁% pred. ($p < .001$).
7. Anxiety at discharge and daily functioning at 3 months were the most influential factors in predicting depressed mood ($\beta = .41$ & $.35$, $p < .001$, respectively).
8. In addition, anxiety and personal health competence were the two consistent variables in predicting depressed mood for patients with COPD.

Discussion

Using Roy's Adaptation Model conceptual framework, our study found self-concept and interdependence mode variables of personal health competence, anxiety, daily functioning and family emotional coping, strongly predicted depressed mood in patients with COPD at discharge and 3 months after hospital discharge. Anxiety and personal health competence predicted depressed mood at discharge. In addition to anxiety and personal health competence, low daily functioning and ineffective family emotional coping were significant predictors in depressed mood 3 months after discharge. Our findings are similar to explanatory research findings in other chronic illnesses in representative populations in previous studies (Kessler et al., 2006; Leung, Chen, Lue, & Hsu, 2007). The anxiety and difficulties for families in emotional coping may relate to increasing caregiving responsibilities after discharge, with increasing concerns about prolonged caregiving between patients and their families. High patient anxiety may make it even more difficult for family members to cope, especially when patients appear depressed, thus leading to a downward spiral that may result in rehospitalization.

The data analyses suggested that anxiety was the best predictor of depressed mood at discharge, but that daily functioning was a better predictor 3 months after discharge. Initial causes of

anxiety may have subsided by three months post-discharge and patients may have learned to cope with dyspnea and pace activities; however, if the disease symptoms continue to impair daily functioning, patients may indeed have more depressed mood in the long-term. Our findings are consistent with Gudmundsson et al. (2005) who found anxiety a determinant of rehospitalization in patients with COPD who perceived poor health status. Nevertheless, the psychological self-concept variables, personal health competencies and anxiety, were consistent in predicting depressed mood over time. Individuals with lower health competence and high anxiety had more negative outcomes, such as depressed mood (Smith et al., 1995). The lack of control, or perceived lack of control of COPD and symptoms perpetuates a downward spiral. Psychological factors appear to be substantial in predicting depressed mood in this population and negatively affect patients' health outcomes immediately at discharge and may last for months.

In summary, the current study suggests that COPD patients at risk for depressed mood may be identified at discharge from nursing assessment with symptoms of high anxiety, low health competence, low daily functioning, and ineffective family emotional coping. Referrals for home care services could provide an opportunity for additional assessment and appropriate interventions. In addition, there is a need for a randomized controlled study to clarify whether the risk factors are in fact causing depressed mood in chronically ill lung patients or are related to other factors.

There are several limitations of the study. The convenience sample of COPD patients limits generalizability and may not represent demographics of other chronically ill populations. The 9 item family coping estimate (FCE) was developed for practice in homecare nursing as presented by Freeman and Heinrich (1981) and had not been reprinted or used previously for research. Family emotional coping was one item of the FCE that showed significance and therefore warrants further study. Moreover, an explanatory model within a natural setting such as the home may consider additional factors not measured in the current study, such as the living location and who in the family provides the support.

Implications for practice

For practice in homecare settings, nurses, occupational and physical therapists and others need to be alert for factors that could indicate increasing risk for depressed mood. When speaking with the patient and family, assess anxiety - does the patient report or seem to be nervous, high strung, or have difficulty trying to calm down. Does the patient express feelings that he or she can control what is happening when they get short of breath or have to stop their activities (health competence). Are they having increasing difficulty doing their daily activities such as bathing and dressing? Is the family expressing that coping with the patient emotionally is becoming harder, that things are not turning out the way they expected? And finally to determine if depressed mood is present or developing, ask patients if they are in low spirits, or feeling down-hearted and blue, or even if they feel others would be better off if they were dead. A mental health consult may help if initiated. Interventions at hospital discharge that include referral to home care nursing provide a window of opportunity to assist the patient to achieve anxiety reduction through relaxation techniques, to provide education on the disease and opportunities for decision-making so that patients can control health decisions to build competence, to develop activities to improve daily functioning such as pacing (OT and PT strengths) and medication management, and to increase the family's ability to cope emotionally with caregiving through discussion of expected changes and available resources.

Recommendations

This study supported the conceptual framework in that after considering the impact of physiological mode (severity of disease), risk factors that may be controlled (personal health competence, anxiety, daily functioning, and family emotional coping adaptive modes) are related to depressed mood. These factors could be changed to promote adaptation and to prevent depression from occurring. Intervention for depressed mood in patients with obstructive lung disease should begin with assessment of at least four important factors: anxiety, personal health competence, daily functioning, and family emotional coping. It is possible that interventions at discharge could develop informal caregiving support with contact to community resources when home care services for anxiety reduction, enhancement of perceived health competence, daily functioning and family support are not available. The ideal of integrated health care at home must address emotional as well as physical well-being for patients and family members to decrease negative health outcomes such as depressed mood in patients with chronic illness.

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Input Stimulus**Effectors/Adaptive Modes****Output** **Figure 1.**

Conceptual Framework was adapted from Roy's Adaptation Model (1991). Dashed lines in the conceptual model are feedback loops.

Table 1

List of Variables Measured and Instruments with Validity and Reliability

Instrument	Measured Variables	Validity/Reliability
Microlab 3100 spirometer ($\dot{V}$ FEV ₁ % pred.)	Physiological status/disease severity	Accuracy $\pm$ 2%
Numeric Rating Scale (NRS)	Dyspnea	Test-retest reliability $r = .89 - .92$ concurrent validity $r = .88 - .94$
Personal Health Competence Scale (PHCS)	Personal health competence (PHC)	$r = .82 - .90$ cronbach's alpha = .78
-Anxiety Subscales—Psychological Functioning of the Pulmonary Functional Status Scale	Anxiety	*Internal consistency cronbach's alpha = .91
Daily Activities Functioning Subscale of the Pulmonary Functional Status Scale	Daily functioning	*Internal consistency cronbach's alpha = .93
Family Coping Estimate (FCE): an item of family coping in the home setting (Question 8)	Family emotional coping (FEC)	Internal consistency cronbach's alpha = .75
Depression Subscales—Psychological Functioning of the Pulmonary Functional Status Scale	Depressed mood	*Internal consistency cronbach's alpha = .84

$\dot{V}$ FEV₁ % pred. = Forced Expiratory Volume in 1 second percent predicted

Table 2

Relationship between Dyspnea, PHC, Anxiety, Daily Functioning, Family Emotional Coping, and Depressed Mood at Discharge and 3-Months after Discharge

Variables	[†] Depressed Mood	
	at Discharge	after Discharge
Dyspnea	-.19 [*]	-.03 ^{ns}
Personal Health Competence	.57 ^{**}	.54 ^{**}
[†] Anxiety	.65 ^{**}	.72 ^{**}
Daily Functioning	.33 ^{**}	.46 ^{**}
Family Emotional Coping	.35 ^{**}	.41 ^{**}

[†]Notes. Higher scores in anxiety and depressed mood indicate less anxious and depressed.

*
 $p < .05$;

**
 $p \leq .001$

Table 3

Predictors of Depressed Mood at Hospital Discharge and 3-Month After Hospitalization in Regression Models

Variables	Standardized β	
	r^2 at Discharge (n=110)	r^2 after Discharge (n=101)
Dyspnea	-.04 ^{ns}	.12 ^{ns}
Personal Health Competence	.30 ^{***}	.27 ^{**}
Anxiety	.41 ^{***}	.19 [*]
Daily functioning	.09 ^{ns}	.35 ^{***}
Family Emotional Coping	.10 ^{ns}	.25 ^{**}
Adjusted R^2	.466	.454
F value	16.87 ^{***}	14.87 ^{***}

r^2 Notes. These two regression models were controlled for FEV₁ % predicted

ns= not significance ;

*
 $p < .05$;

**
 $p \leq .01$;

 $p \leq .001$