Original Article

Depression Outcome Expectancy in Primary Care in Singapore: Symptom Severity as a Mediating Determinant

Shannon Chin, Kokkwang Lim, Chee Khong Yap[1], Meiyin Wong[1]

ABSTRACT

Background: Depression has been identified as the most common mental illness in Singapore. To address this growing concern, the current study focused on the population within the primary care setting since depression has been demonstrated to be highly prevalent in these patients. This study examined the possible predictors of outcome expectancy based on illness perception and depression severity. **Methods:** One hundred and one adult patients with depressive symptoms in primary care were recruited for a cross-sectional study. Positive outcome expectancy was measured using the Depression Change Expectancy Scale, and illness perception was measured using the Illness Perception Questionnaire Mental Health. Depression severity was derived from the Patient Health Questionnaire-9 scores extracted from the participants' medical records. Regression and mediation analyses were applied to explore possible predictors of positive outcome expectancy. **Results:** Regression analysis demonstrated that symptom severity, and specific dimensions under illness perception (i.e., perception of chronicity, perception of personal control, and perception of treatment control) were the most significant predictors of positive outcome expectancy. Mediation analysis found that symptom severity partially mediated the relationship between perception of chronicity and positive outcome expectancy. **Conclusions:** Pharmacotherapy, interventions from allied health professionals, and psychotherapeutic interventions (e.g., strategies from positive psychology, solution-focused therapy, and strengths-based cognitive behavioral therapy) that aim to directly alleviate depressive symptoms as well as improve the perceptions of chronicity, personal control, and treatment control could potentially enhance treatment benefits in primary care patients with depression.

Key words: *Change/outcome expectancy, depression, illness perception, primary care, symptom severity*

Key messages:

- *Patients' optimism about their recovery is associated with their depression severity, perceived chronicity, and overall sense of control.*
- *Depression severity partially mediated the relationship between perceived chronicity and positive outcome expectancy.*

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Department of Psychology, James Cook University, [1]Psychology Services, National Healthcare Group Polyclinics, Singapore

Address for correspondence: Mr. Chee Khong Yap
22, Jln BS3/7, Bukit Serdang, 43300 Seri Kembangan, Selangor, Malaysia. E-mail: yapcheekhong@gmail.com

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Depression has been rising in prevalence globally. The estimated number of people diagnosed with depression worldwide surged by 18.4% between 2005 and 2015.[1] In Singapore, depression was reportedly the most common mental illness, with a lifetime prevalence of 5.8%.[2] Per-capita studies showed that depression was associated with increases in both medical costs (e.g., outpatient and inpatient) and non-medical expenses (e.g., transport and social services).[3]A recent study in Singapore estimated the mean annual total costs per patient to be $7,638, with the indirect costs (e.g., productivity loss attributable to depressive disorder) dominating the total costs for the society.[4]

Depression in primary care

Primary care is, by design, the first line of healthcare for the community, and general practitioners (GPs) have been described as the gatekeepers to mental health services.[5] In Singapore, primary care is provided at polyclinics under the government healthcare facilities and private clinics in the community. A national survey found that, out of 500 respondent GPs, nearly 70% indicated that they were seeing patients with mental illness, and 62% indicated that patients with mental illness comprised only 1-5% of their monthly caseload. Among the GPs who were seeing patients with mental illness, depression (23%) was one of the most common mental illnesses attended to.[6] These findings were admittedly conservative estimates of the local prevalence of depression since studies have indicated that in Asian societies, somatic symptoms of depression may be more salient to patients and could be mistakenly reported merely as symptoms of organic ailments.[7]

Contributing factors to effective treatment

Studies have shown that treatment adherence and positive treatment outcomes could be predicted by patients' perception of their illness, the severity of their illness, and their expectation that the illness will improve with treatment.[8-12] Similar findings have also been reported for depression, where patients' beliefs about depression and its treatment, the severity of their depression, and their outcome expectancy were clearly associated with treatment adherence and outcome.[13-16]

Ironically, it may be the pessimism which depressed patients characteristically experience that often obstructs their own treatment adherence and recovery.[17,18] Reasons for nonadherence to an early termination of treatment includes negative beliefs about antidepressants (e.g., "I can become addicted to antidepressants") and discouragement with the treatment if there is no readily perceived progress.[19,20]

Outcome expectancy

Outcome or change expectancy refers to patients' optimism that their illness will improve in the future and has been shown to be a crucial mechanism for positive change for many forms of psychotherapy.[21] Research also indicates that, unlike other pre-treatment variables such as age, gender, or comorbidity, outcome expectancy can be modified through interventions. In particular, in depressed patients' prior to treatment, positive expectations about the treatment effectiveness predicted their active engagement in therapy, which in turn predicted their relative improvement.[22,23]

Illness perception

Illness perception refers to patients' perception of the characteristics of their illness with or without treatment and is based on the self-regulation model (SRM), which assumes that people actively engage in problem-solving based on their perception of the problem.[24] This model describes three distinct phases in patients' self-regulation: (1) perception formation, (2) coping reaction, and (3) appraisal of the coping reaction. The present study focused on the first phase, i.e., perception formation.

Leventhal *et al.*[25] proposed five dimensions that makeup patients' perception of their own illness such as *identity*, *timeline*, *causes*, *consequences*, and *controllability*. *Identity* refers to the labels an individual uses to characterize the illness and its symptoms. For depression, this would be recognized as symptoms (e.g., having difficulty in sleeping) and how they interpret these symptoms (as a reaction to events, a symptom of depression, an expression of their personality, a result of their lifestyle, etc.). *Timeline* refers to the perceived length of the illness (the duration of the depressive episode, time to recover, predictability of their episodes, etc.). *Causes* refer to the perceived causes of the illness (genetic, social, situational, etc.). *Consequences* refer to the real and imagined impact of the illness. Finally, *controllability* refers to the degree to which patients believe that their illness can be controlled with their self-efficacy or the effectiveness of a given treatment. These dimensions determine patients' overall experience of their illness, which could later influence their coping responses.

Symptom severity

Russell and Kazantzis[26] showed that greater depressive symptomatology was associated with treatment nonadherence. Symptom severity can refer to the overall number of symptoms present, the frequency of occurrence of each symptom, or the intensity of distress from each symptom. The severity of patients' depression may reflect their subjective distress or functional impairment and could further entrench any

negative perceptions of their depression or expectations about treatment outcomes.

The empirical literature on psychological treatment for depression has focused on potential predictors of treatment outcome. However, there are limited studies from Asia that sought to clarify possible contributors to these predictors of treatment outcome. Optimism has frequently been examined as a predictor and overlaps with outcome expectancy thereby associated with patients' hope for mental health recovery.[27] From these studies on optimism, it is possible to make inferences on the relationships among outcome expectancy, illness perception, and symptom severity. In a psychiatric sample, it was found that, a model consisting of high self-esteem, high capacity for leisure activities, low depression score, and low belief that one's problems constitute an illness explained 51% of the variance in the patients' optimism scores.[27] These findings indicated that depression severity and some aspects of illness perception might contribute to outcome expectancy for patients undergoing treatment for depression.

This study explored possible associations among outcome expectancy, illness perception and depression severity, with a view to increasing our understanding of optimal interventions for fostering positive outcome expectancy for depressed patients in primary care.

METHODS

Design and participants

This cross-sectional study involved 101 participants (37 males and 64 females) who were patients seeking psychological services at five polyclinics, i.e., primary care clinics in the community.

Power analysis for multiple regression with 13 predictors was conducted in G*Power to determine a sufficient sample size using an alpha of 0.05, a power of 0.80, and medium effect size (*f2*) of 0.15. The desired sample size was 131 initially; however due to time and human resource limitations for data collection, the sample size obtained for the current study was 101.

Measures

There were two versions (English and Mandarin) of each of the questionnaires used. The Mandarin versions of the questionnaires were first translated from the English version and then reverse-translated for accuracy check. Mandarin-speaking participants were administered the Mandarin versions of the questionnaires, and English-speaking participants were administered the English questionnaires only. The following Likert-based questionnaires were administered:

Depression Change Expectancy Scale (DCES)[21]: The participants' levels of positive outcome expectancy were measured with the DCES, which contains items such as "Even though I try, nothing seems to help improve my mood" and "I have had some success in reducing my depressive symptoms."

Illness Perception Questionnaire Mental Health (IPQ-MH)[24]: The participants' perceptions of their mood disturbance were measured with the IPQ-MH which comprised the *identity*, *structure*, and *cause* scales.

The *identity* scale addressed the participants' characterizations of their concerns, e.g., 'sadness', 'anger', and 'sleeping problems'. This scale also asked the participants to rate the degrees to which their complaints were related to the following parameters: (1) circumstances or events (2) a symptom of depression (3) expression of personality, and (4) their daily routine life.

The *structure* scale addressed the participants' perception of their concerns with respect to seven subscales: (1) the duration of the problem (*timeline chronic*); (2) any recurrent nature of the problem (*timeline cyclical*); (3) the severity of any consequences of the problem (*consequences*); (4) any personal control over the problem (*personal control*); (5) any control that they might gain in treatment over the problem (*treatment control*); (6) how full an understanding they might have about the problem (*coherence*); and (7) any associated emotional distress (*emotional representation*).

The *cause* scale assessed the participants' attributions of the causes of their concerns with respect to four subscales, i.e., biological, psychosocial, structural, and stress-related causes.

Patient Health Questionnaire 9 (PHQ-9)[28]: The level of the severity of the participants' depression was measured with the PHQ-9 by their clinical psychologists. It contains emotions such as "feeling down, depressed, or hopeless" and "feeling tired or having little energy." In addition, the PHQ-9 has been demonstrated to be valid and reliable for screening depression in Singapore for primary care settings.[29]

Procedure

The co-investigator from a university in Singapore collaborated with a team of clinical psychologists from various polyclinics to receive ethical approval from the polyclinics' review board, followed by an acknowledgment from the university's ethics committee.

The clinical psychologists in each polyclinic selected participants among patients who were referred to them by the polyclinic's general practitioners. The clinical psychologists screened each patient's eligibility for the study based on the PHQ-9. The minimum cut-off used in the study was any score ≥1. The eligible patients were then invited to participate in the study. The clinical psychologists also explained and obtained written informed consent from the patients who expressed an interest in participating in the study. Thereafter, the participants were interviewed individually by the co-investigator in a private area of the clinic, to maintain confidentiality. The co-investigator verbally administered the combined questionnaire in the participant's preferred language (i.e., English or Mandarin). The participants were encouraged to ask questions to clarify any items in the combined questionnaire throughout the administration process. Each interview lasted approximately 30 minutes.

Statistical analyses

The data were first screened for missing or erroneous values which was then entered into the Statistical Package for the Social Sciences (SPSS) and sorted with relevant numerical limits for each item on the questionnaire. Missing or erroneous values were manually identified and removed from the data set. Subsequently, checks on assumptions of normality and multicollinearity were conducted. Based on their standardized skew and kurtosis, none of the variables was found to be abnormal at $P < 0.001$. There were no univariate outliers found at $P < 0.001$. None of the variables displayed multicollinearity. The assumption of independence of error was assessed using the Durbin-Watson value. The Durbin-Watson was 2.02, close to 2, satisfying the assumption of independence of error. With all assumptions being met, the data were deemed suitable for multiple regression analysis.

RESULTS

The participants' mean age was 45 years ($SD = 18.5$). The major ethnic group represented Chinese ($n = 84$) along with other groups; Indian ($n = 4$), Malaysian ($n = 7$), and others ($n = 6$). Additional demographic details, such as marital status and employment status, are presented in Table 1.

For the severity scores on the PHQ-9, about 20% of patients ($n = 20$) reported a minimal range of symptoms, 46% ($n = 46$) reported a mild range of symptoms, 23% ($n = 23$) reported a moderate range of symptoms, 10% ($n = 10$) reported a moderately severe range of symptoms, and only about 2% ($n = 2$) reported a severe range of symptoms.

Correlation analysis

There were eight individual IPQ-MH subscales that significantly correlated with positive outcome expectancy: *identity* ($r = -0.40$, $P < 0.001$), *timeline chronic* ($r = -0.66$, $P < 0.001$), *consequences* ($r = -0.43$, $P < 0.001$), *personal control* ($r = 0.61$, $P < 0.001$), *treatment control* ($r = 0.64$, $P < 0.001$), *emotional representation* ($r = -0.28$, $P = 0.005$), *psychosocial cause* ($r = -0.29$, $P = 0.004$), and *structural cause* ($r = -0.29$, $P = 0.003$). Depression severity and positive outcome expectancy were also significantly correlated ($r = -0.41$, $P < 0.001$).

None of the demographic variables were found to be significantly correlated with positive outcome expectancy. Therefore, these variables were excluded from the regression analysis.

Multiple regression

The results of the regression indicated that the correlates explained 67.3% of the variance of positive

Table 1: Descriptive statistics for participant demographic (*n*=101)

Participant Demographic	Frequency	Percent
Age (in years)		
21-39	41	40.6
40-59	37	36.6
60-69	9	8.9
70+	14	13.9
Gender		
Male	37	36.6
Female	64	63.4
Ethnicity		
Chinese	84	83.2
Malay	7	6.9
Indian	4	4
Others	6	5.9
Language		
English	77	76.2
Mandarin	24	23.8
Education		
No formal education	2	2.0
Primary	10	9.9
Secondary	37	36.6
Tertiary	33	32.7
Missing data	19	18.8
Marital status*		
Single	41	40.6
Married	44	43.6
Separated	12	11.9
Divorced	4	4.0
Employment status*		
Student	11	10.9
Employed	57	56.4
Unemployed	32	31.7

*Missing data from one participant

outcome expectancy (R^2 = 0.67, F (9,91) = 20.77, P < 0.001). Depression severity (β = -0.22, P = 0.001), *timeline chronic* (β = -0.24, P = 0.008), *personal control* (β = 0.29, P < 0.001), and *treatment control* (β = 0.29, P = 0.001) significantly predicted positive outcome expectancy.

Mediation analysis

The relationship between *timeline chronic* and positive outcome expectancy was partially mediated by depression severity [Figure 1]. The predictor variable (*timeline chronic*) was significantly correlated with both proposed mediator (depression severity; β = 0.33, P=0.001) and outcome variable (positive outcome expectancy; β = -1.78, P < 0.001). Furthermore, depression severity was significantly correlated with positive outcome expectancy (β = -1.10, P < 0.001). A hierarchical regression was conducted with depression severity and *timeline chronic* as predictor variables and positive outcome expectancy as the outcome variable. The model with *timeline chronic* as the sole predictor explained 43% of the variance [R^2 = 0.43, F (1, 99) = 74.61, P < 0.001] while the model with *timeline chronic* and depression severity both as predictors explained 47.3% of the variance [R^2 = 0.47, F (2, 98) = 44.05, P < 0.001]. The additional variance explained by depression severity was 4.4% [R^2 change = 0.044, sig. F change < 0.01] which reflected a partial mediation. None of the other correlations were found to be mediated by depression severity.

DISCUSSION

Illness perception and outcome expectancy

The regression analysis identified three subscales of illness perception as significant predictors of outcome expectancy: *personal control*, *treatment control*, and *timeline chronic*. The first two variables showed positive correlations with outcome expectancy, while the last variable showed a negative one. These results indicated that, the more influence the patients believed that they themselves or their treatment had on their depressive symptoms; the more optimistic they would be about their condition. This is supported by past findings that mood in depressed patients could be improved by reducing learned helplessness and cultivating an adaptive sense of control.[30] Thus, a fundamental process of depression recovery seems to be a progressively stronger sense of self-efficacy or confidence in the course of treatment. The current findings on chronicity suggest that the more the patients believed that their depressive symptoms might improve only after an extended length of time, the less optimistic they would be about their eventual recovery.

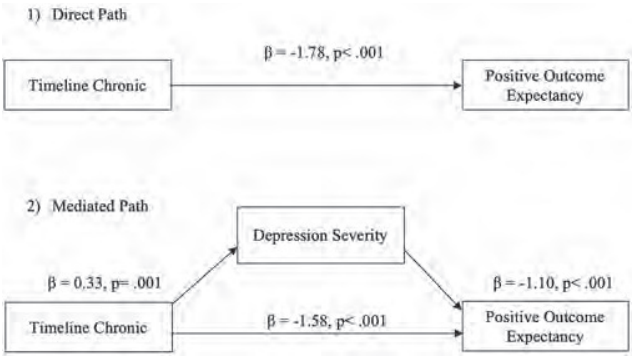

Figure 1: Model testing hypothesis that depression severity mediates the relationship between timeline chronic and positive outcome expectancy

Depression severity and outcome expectancy

Depression severity was negatively associated with positive outcome expectancy. Korn*et al*.[31] conducted a study with patients with major depressive disorder (MDD) who were given more desirable information and less undesirable information. Compared to the control group, the MDD patients did not engage in optimistically biased updating, despite having received more information that would warrant an optimistically biased view about future life events. Thus, providing depressed patients with general encouragement and positive reinforcements may not be sufficient in promoting positive outcome expectancy. Interventions with a more sustained and in-depth focus on inducing positive biases such as those from positive psychology and cognitive bias modification may prove to be more impactful.[32]

Depression severity in its various forms (e.g., duration and severity of individual depressive episodes, number of previous episodes, and comorbidity) has been noted as a salient predictor of chronicity.[33] similarly in this study, depression severity acted as a partial mediator for the relationship between the perception of chronicity and outcome expectancy. This mediation mechanism suggests that outcome expectancy is influenced not only by subjective perception but also by objective symptomatology and functional impairment. Thus, while psychotherapy is often beneficial, an appropriate range of physically active interventions could also be crucial in consolidating depressed patients' optimism about their recovery. These somatic interventions that directly target symptom reduction and hence symptom severity (e.g., pharmacotherapy and occupational therapy for patients needing physical rehabilitation) may then leverage on this mediation mechanism in encouraging patients' confidence about their eventual recovery. It is then recommended that especially for primary care, in the spirit of primary and secondary

prevention, therapeutic services from medical doctors and allied health professionals trained in mental health should be made available to depressed patients.

In essence, psychosocial services that are most impactful to depressed patients in primary care provide: (1) accurate assessment of the overall severity of the patients' depression, (2) psycho educational information and advice that maximally inspire hope that is justified by the assessment results, and (3) interventions that deliberately deflate the outlook that depression is inevitably protracted and elicit an expectancy that depression could be readily contained with evidence-based strategies. In particular, strengths-based cognitive-behavioral therapy (SB-CBT) has structured activities that guide patients to minimize negative biases in their expectations,[34] and solution-focused therapy (SFT) has conversational strategies that accentuate the patients' own resourcefulness (including their positive utilization of treatment) and direct their attention to even small signs of success which could then decrease any illness perception with a chronicity bias.[35]

Limitations

As the participants were recruited from patients who were already attending their appointments, they might have possessed relatively positive outcome expectancy for their depression. It is possible that these patients were more likely to be optimistic about their condition to begin with, leading to a probable selection bias. It would have been interesting to test the hypotheses with a sample that included patients with depression who had either discontinued or refused treatment. Additionally, a majority of the patients were found to have relatively low depression severity, with only about 12% reporting moderately severe to severe symptoms. Although this may not be unusual in a primary care setting, where many patients are functioning relatively well in their daily lives in spite of their symptoms, it may have contributed to a more positive bias in the sample. Therefore, the current study could not be generalized to a more severely depressed population.

This study also did not measure the possible presence of comorbidity. While the participants were instructed to restrict their responses to the context of their depression, the responses from participants with additional mental health conditions or physical diseases might have been complicated by the more varied stressors in their lives. Moreover, clinical details such as the prior number of depressive episodes, family psychiatric history, and individual psychiatric history were not included in the scope of the present study. These are additional factors that may have potentially confounded the results of the regression analysis. Future studies may analyze these factors together with outcome expectancy which may reveal additional insights into treatment adherence.

In addition, due to time and human resource limitations for data collection, the sample size for the current study was limited to 101, rather than the desired 131. The scales used in the Mandarin versions of the questionnaires were also not validated after the translation process due to the study's limited timeframe. This lessened the sensitivity of the statistical analyses and decreased the likelihood of detecting possible effects.

CONCLUSIONS

Patients' confidence in their own recovery from depression appears to be linked to their beliefs about how long their depression would last as well as how much they can boost their recovery by themselves and through their treatment. Interventions from SB-CBT, SFT, and positive psychology can assist the patients in developing an adaptively optimistic attitude as they work toward recovery. The patients' subjective perception of their depression seems to influence their objective symptomatology, which may, in turn, influence their subjective outcome expectancy. In primary care, this mediating mechanism could be expeditiously curbed with psychotropic medication prescribed by family physicians or general practitioners as well as somatic interventions from occupational therapists or physiotherapists for depressive symptoms that interfere with physical functioning, while psychotherapy aims to ameliorate underlying psychosocial elements for more integrated and sustainable recovery.

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Conflicts of interest

There are no conflicts of interest.

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