Original Article

Grit and the Relationships among Psychological Distress and Suicidality in Female Patients with Breast Cancer

Ji Seon You\textsuperscript{1,2}, C. Hyung Keun Park\textsuperscript{1}

\textsuperscript{1}Department of Psychiatry, Asan Medical Center, Seoul, \textsuperscript{2}Department of Psychology, Chung-Ang University, Seoul, Korea

Correspondence: C. Hyung Keun Park

Department of Psychiatry, Asan Medical Center, 88 Olympic-Ro, 43-Gil, Songpa-Gu, Seoul 05505, Korea
Tel: 82-02-3010-1657 Fax: 82-2-485-8381 E-mail: hkpark98@amc.seoul.kr

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Abstract

Purpose
The risk of suicide is approximately two times higher in patients with breast cancer compared to the general population. Suicide risk factors are widely investigated but research on the protective factors is lacking. We investigated whether each subscale of grit, consistency of interest and perseverance of effort, could serve as a protective factor against suicidality.

Materials and Methods
Participants were recruited at the Stress Clinic for Cancer Patients, a psycho-oncology clinic at Asan Medical Center from May 2019 to March 2021. A total of 140 female patients with breast cancer completed self-administered questionnaires including Grit scale, Distress thermometer, and Mini International Neuropsychiatric Interview (MINI) suicidality module. We used PROCESS macro for analyzing the mediation model to identify the protective factors for suicidality.

Results
Our findings showed that perseverance of effort showed statistically non-significant associations with psychological distress (p=0.403) and suicidality (p=0.945), however, consistency of interest decreased suicidality through psychological distress ($\beta = -0.015$, 95% confidence interval = -0.035, -0.002).

Conclusion
The result shows that consistency of interest can be a protective factor against suicidality by reducing psychological distress.

Keywords
Depression, Anxiety, Stress, Suicide, Protective factors
**Introduction**

Cancer is one of the leading causes of death. Breast cancer is the most prevalent cancer among women and is the primary reason for cancer-related mortalities [1]. Being diagnosed with breast cancer can be a traumatic experience for women which can affect their life physically, socially, psychologically, and interpersonally, or it can be an acute stressor leading to anxiety, depression, and suicidal ideation [2]. Among patients with breast cancer, approximately 73% report anxiety and 68% report depression [3], which is one of the main causes of suicide in these individuals [2].

Distress is a discomfort response associated with psychological or social experiences, from common feelings to abnormal problems [4]. Distress includes psychological distress referring to psychological dysfunction such as that experienced in stressful events [5]. Psychological distress includes stress, depression, and anxiety [6]. Patients diagnosed with cancer commonly experience psychological distress. Previous studies have showed that approximately 35–50% of patients with breast cancer are affected by various sources of stress leading to psychological difficulties [7]. Further, among patients with breast cancer, approximately 70% reported experiencing depression, anxiety, and stress, respectively [3], suggesting that these factors significantly contribute to psychological distress [6].

The risk of suicide is about twice in patients with breast cancer compared to the general population [8]. Psychological distress, including depression, anxiety, and stress, is a known cause of suicidal ideation and behavior in patients with breast cancer [9]. Moreover, factors such as age, employment status, and loneliness are known risk factors of suicide [10], as these factors exacerbate the psychological condition. Although the risk factors for suicide are well established, comparatively little is known about the protective factors, with limited studies conducted on factors other than social support [11].
Grit is a trait which is characterized by maintaining interest and persistent behavior for long-term goals. Grit involves dedicating oneself to tackling difficult tasks, persisting with effort and enthusiasm over extended periods of time even in the face of setbacks, obstacles, and periods of limited progress. There are two aspects of grit, the consistency of interest and perseverance of effort [12]. Grit is associated with lower suicidal ideation [13] and increased resilience [14]. Grit can also be protective against physical and mental health problems [15,16] and suicidality [17].

The present study investigated the associations of each aspect of grit with psychological distress and suicidality in female patients with breast cancer. We hypothesized that (1) there is an association between grit, psychological distress, and suicidality and that (2) grit could be protective against psychological distress and suicidality.

Materials and Methods

1. Participants

Patients with breast cancer who visited the Stress Clinic for Cancer Patients, a psychoncology clinic at Asan Medical Center, from May 2019 to March 2021 were recruited. Board-certified psychiatrists interviewed each participant. Among them, female patients aged 18–80 were eligible for inclusion in this study. Those with a history of intellectual disability or organic brain damage or who could not understand the Korean language were excluded. Informed consent was obtained from all participants. All data were gathered through a standardized self-reported questionnaire and interviews. We collected sociodemographic and clinical information including age, marital status, education level, employment status, living status, familial history of psychiatric disorders, history of psychiatric disorders before being diagnosed with breast cancer, history of psychiatric admission, history of suicide attempt(s), and history of cancer.
treatment within two months. Among the 176 participants who were registered, data from 140 individuals who completed the three assessments on Grit, Distress thermometer, and Mini International Neuropsychiatric Interview (MINI) Suicidality Module, were used for the analysis. The Institutional Review Board of Asan Medical Center (2019-0626) approved and monitored this study.

2. Measurements

1) Grit

Grit was evaluated using a 12-item, self-reported questionnaire that assessed trait-level perseverance and passion for accomplishing long-term goals [12]. The two subscales of the grit scale measured consistency of interest and perseverance of effort and comprised six items each. All the items of consistency of interest were assessed using reverse scoring. Consistency of interest means maintaining a similar value of one’s interest. Perseverance of effort is a tendency to diligently keep pursuing a long-term goal despite difficulties. Items were rated on a five-point Likert Scale: 1 (Very much like me) to 5 (Not at all like me). Scores ranged 12–60.

2) Distress thermometer (DT)

Distress thermometer is a self-reported screening tool for psychological distress with one item [4]. Respondents were asked how much psychological distress they had experienced in the past week, including the day of the interview or questionnaire. The scores range from 0 (no distress) to 10 (extreme distress).
3) Mini International Neuropsychiatric Interview (MINI) Suicidality module

The MINI suicidality module evaluated suicidal ideation, plan, and attempt within the last month or lifetime with six items [18]. The total scores ranged from 0 to 33, and scores of 1–5 points were deemed low risk, 6–9 points were deemed intermediate risk, and over 10 points were deemed high risk [19].

3. Statistical analysis

All statistical analyses were conducted using IBM SPSS statistics 21.0 for PC (SPSS, Inc, Chicago, IL). Descriptive statistics were used to present sociodemographic characteristics. Using the PROCESS macro for SPSS, the mediation effects of psychological distress in the relationship between grit and suicide risk were evaluated after adjusting for age and treatment history of breast cancer within two months. Significant mediation effects were determined with the 95% confidence interval (CI), excluding zero. We applied model 4 and performed 5,000 bootstrapping at a significance probability of 0.05.

Results

1. Sociodemographic and clinical characteristics of participants

The sociodemographic and clinical characteristics of the participants are summarized in Table 1. The age of the participants ranged 25–77 years. Of the total sample, 82.9% had a treatment history of breast cancer within two months, and 19.3% had attempted suicide.

2. Pearson’s correlation coefficient among variables

The result of the correlation analysis estimated using Pearson’s coefficient are presented in Table 2. Correlation analyses showed that consistency of interest was negatively correlated with
distress \( (r=-0.286, p<0.001) \) and suicidality \( (r = -0.218, p<0.05) \), whereas perseverance of effort was not correlated with distress and suicidality. Distress was positively correlated with suicidality \( (r=0.349, p<0.001) \).

3. Regression and Mediation Analyses

Bootstrapping, as proposed by Hayes [20], was performed to investigate the mediating effect of psychological distress in the relationship between consistency of interest and suicidality. Regression model fits from the consistency of interest (independent variable) to psychological distress (the mediating variable) were adequate \( (F=6.607, p<0.01) \). A regression model in which the consistency of interest and psychological distress go to suicidality (the dependent variable) showed an adequate model fit \( (F=5.381, p<0.01) \).

Regression coefficients for the pathways are presented in Table 3. Consistency of interest \( (\beta=-0.209, p<0.05) \) was negatively significantly correlated with psychological distress i.e., psychological distress decreased as consistency of interest increased. The independent variable was not associated with suicidality \( (\beta=-0.125, p=0.154) \), whereas the path from psychological distress to suicidality was significant \( (p<0.05) \). The total effect of consistency of interest on suicidality was statistically significant \( (\beta=-0.189, p<0.05) \).

The mediating model of psychological distress on the relationship between consistency of interest and suicidality is shown in Figure 1, and the mediating effects are shown in Table 4. The results of the indirect effect through bootstrapping found that psychological distress has mediating effects on the relationship between consistency of interest and suicidality, as consistency of interest \( (\beta=-0.015, 95\% \text{ confidence interval } [CI] = [-0.035, -0.002]) \) did not include zero in the confidence interval. As shown in Tables 3 and 4, perseverance of effort was not significant in the mediation analysis.
Discussion

The current study was a cross-sectional analysis of the mediating effects of psychological distress on the relationship between each aspect of grit and suicidality. Our findings suggested that consistency of interest significantly reduced suicidality by decreasing psychological distress. On the other hand, perseverance of effort did not show any significant effects on either suicidality or psychological distress.

We observed that consistency of interest was associated with a decrease in psychological distress among patients with breast cancer. Our results are in line with that of previous studies which demonstrated a negative correlation between consistency of interest and psychological distress [21,22]. These findings highlight the significant impact of consistency of interest on mental health and psychological factors. Consistency of interest is a personality trait that is characterized by maintaining an individuals’ behavioral patterns or being reflective of an individuals’ values [12]. Thus, individuals with higher consistency of interest experience a lower level of psychological distress as they maintain the focus on their tasks and seek to accomplish their goals despite stressful circumstances [21]. A previous study [21] demonstrated that consistency of interest can significantly contribute to improving mental health and fostering psychological resilience, particularly among individuals passionate about activities such as music, potentially buffering against depression arising from psychologically stressful situations. Further, individuals with breast cancer who maintain a high level of consistency of interest, may keep their tasks, including taking breast cancer, psychiatric medication, or rehabilitation therapy, thereby impacting the outcome of psychiatric interventions. These findings suggest that consistency of interest potentially leads to a reduction in suicidality. In line with previous studies, our results showed that consistency of interest could be protective against suicidality by decreasing psychological distress.
Although it is not known in detail how consistency of interest can be increased, enhancing grit could be one of the methods that can be used to improve consistency of interest. Grit can be enhanced by establishing a top-level goal. The iterative process of seeking answers to the fundamental question of “Why?” facilitates the identification of individuals’ deepest aspirations [23]. Furthermore, we suggest focusing on interest and purpose to enhance the consistency of interest in cancer patients, among the four critical components for developing grit: interest, practice, purpose, and hope. Interest begins with the passion derived from enjoying one's work, involving developing and nurturing a fascination with specific areas. Individuals can identify their interests by asking, "What activities do I find enjoyable?" Interest matures through purpose, which is the belief that one's work is significant. Purpose includes the intention to contribute to the happiness of others through one’s work [23]. If patients find work that interests them while also contributing to the happiness of others, they can expect an improvement in the consistency of interest.

Psychotherapy interventions incorporating elements that enhance the consistency of interest have not yet been extensively studied. However, such interventions can help to maintain motivation and a positive attitude during the treatment process while reducing psychological distress and consequently decreasing suicidality. Therefore, we recommend developing psychotherapy intervention that incorporates the concept of consistency of interest for future interventions with cancer patients.

We found a significant association between psychological distress and suicidality, encompassing both suicidal ideation and suicide attempts. These findings were consistent with prior studies. Psychological distress had the strongest direct impact on suicidal ideation [24]. Another study demonstrated that psychological distress and suicide attempts revealed a robust link between distress factors, such as depression and anxiety, and the prediction of death by
suicide [25]. Other studies have showed a significant association between psychological distress and suicidal ideation and attempt [26]. Another study showed the impact of perceived burden on the associations between psychological distress and suicidal ideation. A perception of burdening others stems from increased psychological distress: this can hinder help-seeking behaviors, compromise financial well-being, and weaken the sense of belonging, consequently leading to suicidal ideation [27]. Consistent with these findings, our study also showed a strong relationship between psychological distress and suicidality.

Psychological distress was not significantly associated with individuals’ perseverance of effort toward their goals. One of the potential reasons could be because of psychological distress, including depression, anxiety, and stress. Previous studies showed that perseverance of effort was not associated with all aspects of psychological distress. Perseverance of effort is negatively associated with depression only among various psychological distress factors, such as anxiety and stress [21,22]. In our study, since psychological distress was studied as a unified concept, it is possible that some of the several psychological distress factors could potentially contribute to a non-significant association between perseverance of effort and psychological distress.

Both consistency of interest and perseverance of effort did not demonstrate a direct effect on suicidality. Previous studies have shown different results depending on the type of suicidal behavior. Grit is related to a lower level of passive suicidal ideation [13]. Similarly, consistency of interest is negatively associated with suicidal ideation [28]. Another study found no direct effect of consistency of interest on suicide attempt [29]. How grit affects suicidality appears to depend on the specific aspect of suicidal behavior. The current findings suggest that grit has no direct effect on suicidality, which is a comprehensive concept including, suicidal ideation, suicidal plan, and suicide attempt.
The present study had certain limitations. First, the study findings cannot be generalized because the recruitment of the participants was limited to a psycho-oncology clinic. Therefore, caution should be exercised when extending our findings to patients with diverse types of cancer or to breast cancer patients without psychiatric diagnoses. Second, our results cannot demonstrate any causality as this was a cross-sectional study. Third, we investigated psychological distress and suicidality as a unified concept without assessing the effects of specific components, as has been done in previous studies. Consequently, it remains unclear how these specific factors, inherent in both concepts, might mutually influence each other.

Despite these limitations, the current study has several strengths. First, it is one of the initial studies to address grit in a clinical setting. Second, our findings introduced a novel concept of the positive effects of grit in preventing suicidality among patients with breast cancer. Third, all participants were interviewed by board-certified psychiatrists to assess suicidality.

In summary, the present study demonstrates that consistency of interest is associated with psychological distress and has an indirect effect on suicidality. However, neither consistency of interest nor perseverance of efforts has a direct impact on suicidality. These findings highlight a novel aspect suggesting that consistency of interest can exert a positive influence in a clinical setting, implying its significance as an indicator associated with suicidality. Further studies are warranted to explore whether increasing consistency of interest might reduce suicidality by decreasing psychological distress.
Ethical Statement

The Institutional Review Board of Asan Medical Center (2019-0626) approved and monitored this study.

Author Contributions

Conceived and designed the analysis: You SJ, Park CHK.
Collected the data: Park CHK.
Contributed data or analysis tools: You SJ, Park CHK.
Performed the analysis: You SJ.
Wrote the paper: You SJ.

ORCID iDs

Ji Seon You: https://orcid.org/0000-0002-4306-320X
C. Hyung Keun Park: https://orcid.org/0000-0002-2568-1426

Conflicts of Interest

Conflict of interest relevant to this article was not reported.
References

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### Table 1. Sociodemographic and clinical characteristics of participants

<table>
<thead>
<tr>
<th>Variables</th>
<th>Breast-cancer patients (n=140)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. (%)</td>
</tr>
<tr>
<td>Age</td>
<td>51.12 ± 10.67</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>101 (72.1)</td>
</tr>
<tr>
<td>Cohabitating</td>
<td>1 (.7)</td>
</tr>
<tr>
<td>Never married</td>
<td>23 (16.4)</td>
</tr>
<tr>
<td>Divorced</td>
<td>12 (8.6)</td>
</tr>
<tr>
<td>Widowed</td>
<td>3 (2.1)</td>
</tr>
<tr>
<td>Educational level</td>
<td></td>
</tr>
<tr>
<td>Elementary school</td>
<td>1 (.7)</td>
</tr>
<tr>
<td>Middle school</td>
<td>9 (6.4)</td>
</tr>
<tr>
<td>High school</td>
<td>45 (32.1)</td>
</tr>
<tr>
<td>College or higher</td>
<td>85 (60.7)</td>
</tr>
<tr>
<td>Employment status</td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>51 (36.4)</td>
</tr>
<tr>
<td>Unemployed</td>
<td>89 (63.6)</td>
</tr>
<tr>
<td>Living Status</td>
<td></td>
</tr>
<tr>
<td>With others</td>
<td>122 (87.1)</td>
</tr>
<tr>
<td>Alone</td>
<td>18 (12.9)</td>
</tr>
<tr>
<td>Family psychiatric history</td>
<td>15 (10.7)</td>
</tr>
<tr>
<td>Psychiatric history before breast cancer</td>
<td>36 (25.7)</td>
</tr>
<tr>
<td>Psychiatric admission</td>
<td>27 (19.3)</td>
</tr>
<tr>
<td>Suicide attempt</td>
<td>116 (82.9)</td>
</tr>
<tr>
<td>Treatment within 2 months</td>
<td></td>
</tr>
</tbody>
</table>

Values are presented as number (%) or mean ± standard deviation.
Table 2. Pearson’s correlations coefficient among variables (n=140)

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Consistency of interest</td>
<td>—</td>
<td>0.237(^{b)})</td>
<td>-0.286(^{c)})</td>
<td>-0.218(^{a)})</td>
</tr>
<tr>
<td>2. Perseverance of effort</td>
<td>—</td>
<td>—</td>
<td>-0.091</td>
<td>-0.028</td>
</tr>
<tr>
<td>3. Distress</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>0.349(^{c)})</td>
</tr>
<tr>
<td>4. Suicidality</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

\(^{a)}p<0.05, \(^{b)}p<0.01, \(^{c)}p<0.001.\)
Table 3. Unstandardized and standardized regression coefficients for all pathways

<table>
<thead>
<tr>
<th>Path</th>
<th>Estimate B&lt;sup&gt;b)&lt;/sup&gt;</th>
<th>SE</th>
<th>95% CI</th>
<th>p&lt;sup&gt;a)&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consistency of interest [\rightarrow] Psychological distress</td>
<td>-0.125</td>
<td>0.051</td>
<td>-0.226 - 0.024</td>
<td>0.016</td>
</tr>
<tr>
<td>Consistency of interest [\rightarrow] Suicidality</td>
<td>-0.030</td>
<td>0.021</td>
<td>-0.071 - 0.011</td>
<td>0.154</td>
</tr>
<tr>
<td>Psychological distress [\rightarrow] Suicidality</td>
<td>0.124</td>
<td>0.034</td>
<td>0.056 - 0.191</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Perseverance of effort [\rightarrow] Psychological distress</td>
<td>-0.043</td>
<td>0.051</td>
<td>-0.144 - 0.058</td>
<td>0.403</td>
</tr>
<tr>
<td>Perseverance of effort [\rightarrow] Suicidality</td>
<td>0.001</td>
<td>0.020</td>
<td>-0.039 - 0.042</td>
<td>0.945</td>
</tr>
<tr>
<td>Perseverance of effort [\rightarrow] Suicidality</td>
<td>0.134</td>
<td>0.067</td>
<td>0.201</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

<sup>a)</sup>Significant findings at p<0.05 are in bold.  
<sup>b)</sup>Unstandardized regression coefficient.  
<sup>c)</sup>Standardized regression coefficient.
**Table 4.** Mediating effect of psychological distress on the relationship between grit and suicidality

<table>
<thead>
<tr>
<th>Path</th>
<th>B&lt;sup&gt;a)&lt;/sup&gt;</th>
<th>SE</th>
<th>LLCI</th>
<th>ULCI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consistency of interest → Psychological distress → Suicidality</td>
<td>-0.015</td>
<td>0.009</td>
<td>-0.035</td>
<td>-0.002</td>
</tr>
<tr>
<td>Perseverance of effort → Psychological distress → Suicidality</td>
<td>-0.006</td>
<td>0.007</td>
<td>-0.022</td>
<td>0.009</td>
</tr>
</tbody>
</table>

<sup>a)</sup> Unstandardized regression coefficient.


Fig. 1. Mediating effects of psychological distress on associations between consistency of interest and suicide risk. Adjusted for age and cancer treatment within two months. Thick lines connecting latent variables indicate significant path estimates (p<0.05).