

Validation and psychometric properties of the Cancer Stigma Scale (CASS) in the Greek population

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ABSTRACT

Background: Cancer-related stigma and mental illness stigma remain significant barriers to social inclusion, help-seeking, and quality of life. The Cancer Stigma Scale (CASS) is a multidimensional instrument designed to assess cancer-related stigma, yet it has not been validated in the Greek context. This study aimed to validate the Greek version of CASS and to examine its association with attitudes toward mental illness using the Community Attitudes toward the Mentally Ill (CAMI) scale.

Methods: A cross-sectional study was conducted among 176 undergraduate, postgraduate, and doctoral students in Thessaloniki, Greece. Participants completed the CASS and CAMI scales along with demographic information. Reliability, construct validity, and convergent validity were assessed. Internal consistency was evaluated using Cronbach's alpha, while associations were examined using Spearman correlations, regression analyses, and receiver operating characteristic (ROC) curves.

Results: The Greek version of CASS demonstrated high internal consistency (Cronbach's $\alpha = 0.89$) and acceptable construct validity, supporting its multidimensional structure. Younger age and limited personal or family illness experience were associated with higher cancer-related stigma levels. Moderate to strong positive associations were observed between cancer-related stigma and mental illness stigma. The regression model was not statistically significant ($F = 1.61$, $p = 0.21$) and explained 9.6% of the variance ($R^2 = 0.096$). ROC analyses demonstrated limited to moderate discriminatory ability, with selected subscales showing acceptable performance (AUC up to 0.780, 95% CI: 0.653–0.906).

Conclusion: The Greek version of CASS is a reliable and valid instrument for assessing cancer-related stigma. The findings highlight the persistence of stigma in Greece and its association with sociodemographic and psychosocial factors, supporting the need for culturally tailored anti-stigma interventions.

INTRODUCTION

Stigma constitutes a complex social and psychological phenomenon that has historically affected individuals experiencing physical and mental illness [1–3]. Stigma refers to a socially discrediting attribute that reduces an individual “from a whole and usual person to a tainted, discounted one” [2]. Contemporary conceptualizations further describe stigma as a multidimensional process

involving labeling, stereotyping, separation, status loss and discrimination within a context of social power [3]. Although stigma has been extensively examined in relation to mental illness, increasing attention has been directed toward the psychosocial burden associated with cancer-related stigma and its implications for psychological adjustment, treatment engagement, and quality of life.

Cancer has historically been associated with fear, suffering, death, uncertainty and social exclusion [4, 5].

Cancer has often functioned as a symbolic illness surrounded by metaphors of hopelessness, contamination, and personal weakness [4]. Despite substantial advances in oncology and survivorship care, stigmatizing attitudes toward cancer continue to persist across many societies, influencing interpersonal relationships, healthcare-seeking behaviors, emotional disclosure and social integration [6, 7]. Cancer-related stigma has also been associated with increased psychological distress, social withdrawal, reduced self-esteem, and impaired treatment adherence among patients and survivors [8, 9].

Recent psycho-oncology research increasingly recognizes stigma as a major psychosocial determinant of cancer outcomes. Individuals affected by cancer may experience public stigma, perceived stigma, internalized stigma, and anticipated stigma, each contributing differently to emotional burden and psychosocial functioning. Public stigma refers to negative societal attitudes toward individuals with cancer, whereas self-stigma reflects the internalization of these negative beliefs by affected individuals [10, 11]. In addition, stigma toward cancer may intersect with broader cultural attitudes regarding vulnerability, disability, dependency and mortality, highlighting the importance of sociocultural context in shaping stigma-related experiences.

Within the Greek sociocultural context, cancer stigma may be particularly influenced by traditional beliefs, religious interpretations and family-centered social dynamics. Greece remains a society in which family structures play a central role in caregiving, emotional support and illness management. Serious illness is frequently conceptualized as a collective family burden rather than solely an individual experience. In some cases, silence surrounding illness may emerge as a protective mechanism intended to preserve family stability and emotional cohesion. However, such silence may simultaneously reinforce stigma-related attitudes, fear and social avoidance.

Religious and fatalistic beliefs may also contribute to stigma formation in Greek society. Orthodox Christian traditions remain deeply embedded in Greek culture and may influence perceptions of illness through existential or moral frameworks. Although spiritual beliefs can provide resilience and emotional support, fatalistic interpretations of illness as destiny, punishment, or divine testing may contribute to fear, guilt, and social distancing [12]. Similar cultural mechanisms have previously been described in stigma research related to both cancer and mental illness [12].

Research examining stigma toward mental illness in Greece has demonstrated persistent public misconceptions, social distancing, and discriminatory attitudes [13]. However, relatively little research has examined cancer-related stigma within the Greek population, and validated psychometric instruments assessing cancer stigma remain limited. The absence of culturally validated assessment tools restricts the ability to systematically evaluate stigma-

related attitudes and to develop targeted psychosocial interventions within oncology settings.

The Cancer Stigma Scale (CASS) was originally developed to assess multidimensional attitudes toward cancer, including perceptions of avoidance, personal responsibility, severity, financial discrimination and policy opposition. Previous international validation studies have demonstrated satisfactory psychometric properties and have highlighted the importance of culturally sensitive adaptation procedures [14]. Nevertheless, no study to date has validated the CASS in the Greek language or examined its relationship with mental illness stigma within the Greek sociocultural context.

Stigma may also be understood through broader social identity and intergroup frameworks, whereby individuals perceived as vulnerable or socially ‘different’ become targets of stereotyping and social distancing [15]. Media representations and public narratives surrounding illness may further reinforce social stereotypes and discriminatory attitudes toward vulnerable groups [16]. Cancer stigma may additionally influence healthcare engagement, treatment adherence, and emotional disclosure, thereby contributing to poorer psychosocial and clinical outcomes [17].

The present study therefore aimed to translate and validate the Greek version of the Cancer Stigma Scale (CASS) and to investigate its psychometric properties in a Greek population sample. Additionally, the study explored associations between cancer-related stigma and mental illness stigma using the Community Attitudes toward the Mentally Ill (CAMI) scale in order to assess convergent validity and examine broader health-related stigma mechanisms. By addressing an important gap in Greek psycho-oncology research, the present study seeks to contribute to the understanding of culturally shaped stigma processes and to support the development of future anti-stigma interventions within oncology and mental health settings.

RESULTS

Descriptive statistics

The sample consisted predominantly of young, highly educated individuals. Detailed demographic characteristics are presented in Table 1.

Reliability and factor structure

The Greek version of the Cancer Stigma Scale demonstrated high internal consistency for the total scale (Cronbach’s $\alpha = 0.89$) and acceptable to good reliability across subscales ($\alpha = 0.72$ – 0.86). Detailed reliability coefficients and factor loading ranges are presented in Table 2. Exploratory factor analysis generally supported the original multidimensional structure of the scale. Most

Table 1: Demographic characteristics of the sample (N = 176)

Variable	n (%) / Mean $\pm$ SD
Age (years)	23.5 $\pm$ 3.9
Gender	
Female	107 (60.8%)
Male	69 (39.2%)
Education level	
Undergraduate	120 (68.2%)
Postgraduate	46 (26.1%)
Doctoral	10 (5.7%)
Personal or family history of cancer	
Yes	70 (39.8%)
No	106 (60.2%)
Personal or family history of mental illness	
Yes	62 (35.2%)
No	114 (64.8%)

Values are presented as frequency (%) or mean $\pm$ standard deviation. This table summarizes the demographic characteristics of the sample, indicating a predominantly young and highly educated population.

Table 2: Reliability and factor structure of the Cancer Stigma Scale (CASS)

Subscale	Cronbach's α	Factor loadings (Range)
Avoidance	0.72	0.45–0.72
Blame	0.74	0.41–0.68
Policy Opposition	0.79	0.47–0.71
Personal Responsibility	0.72	0.38–0.66
Financial Discrimination	0.86	0.53–0.77
Severity Perception	0.75	0.44–0.70
Total CASS	0.89	0.42–0.78

The results demonstrate acceptable to high internal consistency across CASS subscales, supporting the reliability and structural coherence of the instrument.

items loaded onto their theoretically expected factors, providing overall support for the multidimensional structure and construct validity of the Greek version of the scale. Factor loadings across subscales were within acceptable ranges: Avoidance (0.45–0.72), Blame (0.41–0.68), Policy Opposition (0.47–0.71), Personal Responsibility (0.38–0.66), Financial Discrimination (0.53–0.77), and Severity Perception (0.44–0.70). These findings indicate satisfactory item–factor associations and support the construct validity of the Greek version of the instrument. The observed factor structure was consistent with previous international validations of the scale.

Correlation with CAMI

Moderate to strong positive correlations were observed between cancer-related stigma and CAMI

authoritarianism and social restrictiveness ($p = 0.42$ – 0.57 , $p < 0.01$), indicating shared stigma mechanisms. Detailed correlation coefficients are presented in Table 3.

Regression analysis

The regression model was not statistically significant ($F = 1.61$, $p = 0.21$) and explained 9.6% of the variance ($R^2 = 0.096$). A summary of the regression findings is presented in Table 3.

ROC analysis

ROC analyses demonstrated limited to moderate discriminatory ability across most subscales. Selected CAMI dimensions, including Authoritarianism (AUC = 0.770, 95% CI: 0.681–0.859) and Community Mental Health Ideology (AUC = 0.780, 95% CI: 0.653–0.906),

Table 3: Associations between cancer-related stigma (CASS) and mental illness stigma (CAMI)

Correlations between CASS scores and CAMI subscales		
Variable	Spearman's ρ	p -value
CAMI – Authoritarianism	0.42**	<0.01
CAMI – Social Restrictiveness	0.57**	<0.01
CAMI – Benevolence	–0.18	0.07
CAMI – Community Mental Health Ideology	–0.22*	0.04
Age	–0.28	<0.01

Regression model summary: $R^2 = 0.096$; $F = 1.61$; $p = 0.21$. * $p < 0.05$, ** $p < 0.01$. Significant associations between CASS and CAMI dimensions support convergent validity and highlight shared stigma mechanisms, although regression analysis did not yield a statistically significant predictive model.

demonstrated acceptable discriminatory performance. The ROC curves are presented in Figure 1.

Associations with demographics

Subgroup comparisons based on age, educational level and personal or family history of illness were conducted to further explore demographic differences in stigma scores.

DISCUSSION

This study provides the first validation of the Cancer Stigma Scale (CASS) in the Greek context

and demonstrates acceptable psychometric properties consistent with previous international findings. The findings suggest that cancer-related stigma remains a meaningful psychosocial phenomenon within the Greek population, particularly among younger individuals and those without personal or familial experience of illness. The present study contributes to the growing international literature on health-related stigma by extending the psychometric applicability of the CASS to a previously understudied cultural context and by exploring the relationship between cancer-related stigma and mental illness stigma within the same population.

Importantly, the present findings are broadly consistent with previous international validation studies

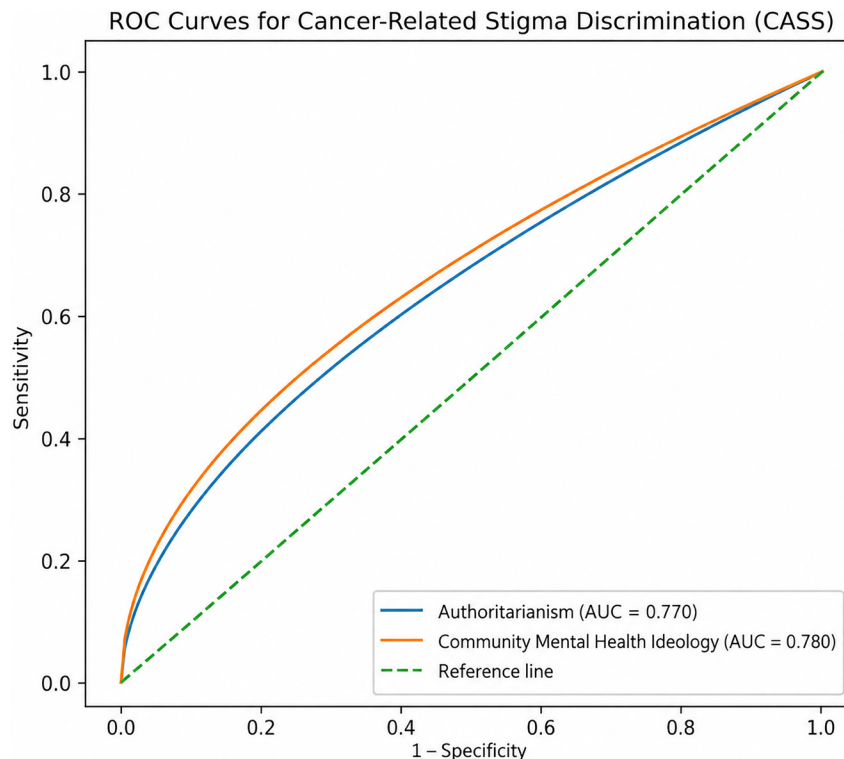


Figure 1: Receiver operating characteristic (ROC) curves for cancer-related stigma discrimination (CASS). The figure illustrates the discriminatory performance of CAMI Authoritarianism (AUC = 0.770) and Community Mental Health Ideology (AUC = 0.780), with the diagonal reference line indicating chance-level discrimination.

of the CASS, including Asian validation studies such as the Chinese adaptation [14]. Similar patterns of internal consistency, multidimensional structure, and stigma-related associations suggest that the underlying psychosocial mechanisms of cancer stigma may demonstrate substantial cross-cultural stability despite differences in healthcare systems, religious beliefs, and sociocultural frameworks. The consistency of findings across Greek and Chinese samples suggests that several dimensions of cancer-related stigma may be relatively stable across culturally distinct populations despite differences in healthcare systems, religious traditions, and sociocultural norms. This observation further supports the cross-cultural applicability of the Cancer Stigma Scale and highlights the potential universality of certain stigma-related beliefs and attitudes. At the same time, the Greek sociocultural context may shape the expression and maintenance of stigma in distinct ways, emphasizing the importance of culturally sensitive interpretation of stigma-related phenomena.

The present findings should be interpreted within the broader sociocultural context of Greece, where cultural values and family dynamics may shape attitudes toward cancer. The lower levels of stigma observed among participants with personal or family experience of illness suggest that familiarity with serious disease may reduce negative stereotypes and promote more empathetic attitudes. At the same time, the central role of the family in illness management may influence communication about cancer, as concerns about protecting loved ones from emotional distress may discourage open discussion. Such patterns may contribute to the persistence of stigma by limiting opportunities for public dialogue and increasing reluctance to disclose a cancer diagnosis.

Cultural and religious beliefs may also influence how individuals interpret and respond to cancer. Although religious faith often provides emotional support and strengthens coping during illness, fatalistic beliefs may influence perceptions of diagnosis, treatment, and prognosis, potentially reinforcing stigma-related attitudes, fear, and avoidance. These observations are consistent with broader theoretical models of stigma, which emphasize that cultural beliefs, labeling, stereotyping and social distancing contribute to the development and maintenance of stigmatizing attitudes across different health conditions [3, 10]. Therefore, culturally sensitive educational and psychosocial interventions that acknowledge prevailing cultural values while promoting accurate information about cancer and encouraging open communication may help reduce stigma within both families and the wider community.

The present findings further support the conceptualization of stigma as a generalized psychosocial construct operating across different health conditions. Moderate to strong correlations between CASS and CAMI subscales suggest that cancer-related stigma and mental illness stigma may share common cognitive, emotional, and social mechanisms, including fear, stereotyping,

blame attribution, and social distancing. These findings align with theoretical stigma frameworks proposed by [2] and later expanded by [3], which conceptualize stigma as a socially constructed process involving labeling, stereotyping, separation, status loss, and discrimination.

The observed association between cancer stigma and mental illness stigma is particularly important within psycho-oncology research. Cancer has historically been associated with fear, death anxiety, uncertainty, and perceived loss of social identity, while mental illness stigma often involves perceptions of unpredictability, dangerousness, or social incompetence. Despite these differences, both conditions may activate broader societal mechanisms of exclusion and symbolic threat. The correlations observed in the present study therefore support the idea that health-related stigma may reflect a broader pattern of social attitudes toward vulnerability, suffering, and deviation from perceived norms of health and productivity.

Importantly, participants with personal or family experience of illness demonstrated lower levels of stigma, supporting the contact hypothesis. According to contact-based theories of stigma reduction, familiarity and interpersonal exposure may reduce fear, increase empathy, and weaken stereotypical beliefs. In the Greek sociocultural context, where family bonds and caregiving roles are often highly salient, experiential familiarity with illness may play a particularly important role in reducing stigmatizing attitudes. Individuals who have directly encountered cancer or mental illness may develop more nuanced and humanized understandings of illness experiences, thereby reducing reliance on stereotypical social narratives.

The findings indicating higher stigma among younger participants may also reflect generational differences in illness exposure, psychological maturity, or social representations of disease. Younger individuals may possess less experiential familiarity with chronic illness and may therefore rely more heavily on culturally transmitted stereotypes or media representations. Furthermore, younger populations may experience greater fear of social disruption, physical vulnerability, or mortality-related concerns associated with serious illness. These findings highlight the importance of early educational and anti-stigma interventions targeting adolescents and young adults.

The ROC analyses demonstrated limited to moderate discriminatory performance across most dimensions, suggesting that cancer-related stigma is not adequately conceptualized as a binary phenomenon. Rather, stigma appears to represent a complex, multidimensional psychosocial construct shaped by cognitive beliefs, emotional responses, social norms, and cultural narratives. This interpretation is consistent with contemporary stigma theory, which increasingly conceptualizes stigma as a dynamic and context-dependent process rather than a fixed attitude or singular construct.

The present study has several important clinical and public health implications. First, the Greek version of the CASS may provide clinicians and researchers with a useful instrument for assessing cancer-related stigma within both community and clinical populations. Early identification of stigma-related attitudes may facilitate the development of psychoeducational interventions, supportive counseling programs, and public awareness campaigns aimed at reducing social isolation and improving psychological adjustment among individuals affected by cancer. Second, the observed association between cancer stigma and mental illness stigma highlights the need for integrated anti-stigma approaches addressing health-related stigma more broadly rather than focusing exclusively on a single condition.

Several limitations should nevertheless be acknowledged. The study sample primarily consisted of university students, limiting the generalizability of findings to older adults, clinical populations, and individuals from more diverse socioeconomic backgrounds. Additionally, the cross-sectional design precludes causal interpretation of the observed associations. Variance explained indices from the exploratory factor analysis were not retained in the archived statistical outputs, limiting the comprehensiveness of construct validity evaluation. Nevertheless, the consistency of factor loadings and satisfactory internal reliability indices support the structural coherence of the Greek version of the instrument.

Future studies should examine the psychometric properties of the Greek CASS in larger and more heterogeneous samples, including oncology patients, caregivers, healthcare professionals, and rural populations. Longitudinal studies may further clarify how stigma evolves across the illness trajectory and whether anti-stigma interventions produce sustained psychosocial benefits. Additional cross-cultural comparisons may also enhance understanding of how cultural values, religion, and healthcare systems shape the manifestation of cancer-related stigma across societies.

Overall, the present findings support the validity and clinical utility of the Greek version of the Cancer Stigma Scale and underscore the importance of culturally informed psycho-oncology interventions aimed at reducing both cancer-related and mental illness stigma within the Greek population.

Limitations

A limitation of the present study is that variance explained indices from the exploratory factor analysis were not retained, which limits the interpretability of construct validity. Nevertheless, the consistency of factor loadings and the strong internal reliability across subscales provide support for the structural integrity of the instrument. Future research should include full variance reporting to strengthen psychometric evaluation.

Additionally, the use of a university-based sample limits generalizability and the cross-sectional design precludes causal inference.

MATERIALS AND METHODS

Participants and procedure

A total of 176 students (undergraduate, postgraduate, and doctoral) from Thessaloniki, Greece, were recruited through convenience sampling in 2024. Participation was voluntary, and informed consent was obtained. The study was approved by the Ethics and Deontology Committee of the Medical School, Aristotle University of Thessaloniki (Protocol No. 97/2024).

Instruments

- **Cancer Stigma Scale (CASS):** Measures multiple stigma dimensions, including avoidance, blame, policy opposition, personal responsibility, financial discrimination, and severity perception.
- **Community Attitudes toward the Mentally Ill (CAMI):** Assesses attitudes toward people with mental illness across authoritarianism, benevolence, social restrictiveness and community ideology.

The CAMI scale was included to assess convergent validity, as it captures attitudes toward mental illness, a related domain of health-related stigma. This approach allows examination of shared stigma mechanisms across different health conditions.

Translation procedure

Both instruments were translated into Greek using a standardized forward–backward translation procedure. Two independent bilingual experts conducted the forward translation, followed by back-translation by a separate bilingual translator. Discrepancies were resolved through consensus to ensure semantic and conceptual equivalence.

Statistical analysis

Internal consistency was assessed using Cronbach's alpha. Construct validity was examined using exploratory factor analysis. Associations were analyzed using Spearman correlations and regression analysis. ROC curve analysis was used to assess discriminatory ability.

CONCLUSIONS

The Greek version of the Cancer Stigma Scale (CASS) appears to be a reliable and valid instrument for assessing cancer-related stigma in the Greek population.

The findings highlight the persistence of stigma and underscore the importance of culturally tailored interventions targeting both cancer-related and mental illness stigma.

Data availability

Data supporting the findings of this study are available from the corresponding author upon reasonable request.

AUTHOR CONTRIBUTIONS

Conceptualization: Vaia Pappa, Diomidis Antoniadis; Methodology: Vaia Pappa, Diomidis Antoniadis; Formal analysis: Vaia Pappa; Writing – original draft: Vaia Pappa; Writing – review and editing: Vaia Pappa, Diomidis Antoniadis, Konstantinos Fountoulakis, Nikitas Arnaoutoglou; Supervision: Diomidis Antoniadis.

CONFLICTS OF INTEREST

Authors have no conflicts of interest to declare.

ETHICAL STATEMENT

The study received approval from the Ethics and Deontology Committee of the Medical School, Aristotle University of Thessaloniki (Protocol No. 97/2024; approval date: December 20, 2024; Thessaloniki, Greece).

CONSENT

All participants provided informed consent in accordance with the Declaration of Helsinki (2013 revision).

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