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Clinical and Psychosocial Predictors of Treatment Success in Cervical Cancer Patients: The Role of Disease Stage, Duration of Illness, and Personality

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ABSTRACT

Background: Cervical cancer remains a leading cause of morbidity and mortality among women. Clinical factors such as disease stage and psychosocial factors like personality may influence treatment success. This study examines the combined effects of disease stage, duration of illness, and personality traits on treatment outcomes in cervical cancer patients.

Methods: A quantitative, cross-sectional study was conducted in 2024 at General Hospital, Semarang, involving 135 cervical cancer patients. Data were collected using a validated and authorized questionnaire. Independent variables included stage of cervical cancer, length of illness, personality while the dependent variable was treatment success. Data were analyzed through univariate, bivariate (Somers'd test), and multivariate analyses using ordinal logistic regression.

Results: Disease stage was significantly associated with treatment success ($p < 0.001$) but showed a weak correlation ($r = 0.183$). Duration of illness had a strong positive correlation ($r = 0.755$, $p < 0.001$), indicating shorter illness duration improved outcomes. Personality traits were strongly correlated with treatment success ($r = 0.763$, $p < 0.001$), with extroverted patients responding better. The three variables together explained 83% of the variance in treatment outcomes.

Conclusions: Disease stage, duration of illness, and personality traits significantly predict treatment success in cervical cancer patients. Integrating clinical and psychosocial assessments supports individualized care strategies and enhances therapeutic outcomes.

Keywords: *Cervical cancer, treatment success, disease stage, duration of illness, personality.*

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1. INTRODUCTION

Cervical cancer remains a significant public health problem worldwide and ranks among the leading causes of cancer-related morbidity and mortality in women. The disease burden is particularly high in low- and middle-income countries, where limited access to healthcare and inadequate screening programs contribute to delayed diagnosis and poor treatment outcomes. Variability in patient prognosis highlights the importance of identifying factors that influence treatment success. Research into both clinical and psychosocial predictors is therefore essential to optimize individualized care, improve survival rates, and reduce the overall burden of cervical cancer on patients, families, and healthcare systems [1].

According to the Global Cancer Observatory (Globocan) 2023, more than 600,000 new cases of cervical cancer and over 340,000 related deaths were reported worldwide. In Indonesia, cervical cancer ranks as the second most common malignancy after breast cancer, with an incidence rate of approximately 24.5 per 100,000 women. Central Java Province is identified as one of the regions with a high incidence, particularly in communities with limited access to early screening programs and reliable health information. Cervical cancer remains a major public health concern in Indonesia and other Southeast Asian nations. National data indicate that cervical cancer accounts for about 20% of cancer cases among Indonesian women, with an estimated 40,000 new cases reported each year [2,3].

In Indonesia and the Southeast Asian region, incidence and mortality still show significant disparities [4,5], Disease stage at diagnosis is a critical clinical predictor of treatment outcomes in cervical cancer. Patients diagnosed at an early stage generally experience higher survival rates and more favorable responses to therapy, while advanced-stage patients face greater treatment challenges and lower success rates. Even among patients with similar clinical profiles, outcomes can vary significantly, indicating that disease stage alone cannot fully explain treatment success. This study focuses on evaluating how disease stage interacts with other patient-related factors to influence therapeutic outcomes, providing a more comprehensive understanding of predictors in cervical cancer care [6].

Duration of illness has been shown to influence treatment outcomes in various cancer populations. Patients with shorter illness duration benefit from timely interventions that prevent disease progression and enhance responsiveness to therapy. Prolonged illness may increase the risk of complications, treatment resistance, or diminished physiological resilience, which can negatively impact therapeutic success. Investigating the association between duration of illness and treatment outcomes provides valuable insights into the urgency and timing of interventions. This study examines how duration of illness contributes to treatment success alongside other clinical and psychosocial factors [7–9].

Personality traits are recognized as significant psychosocial determinants of health outcomes, influencing patient engagement, coping strategies, and adherence to therapy. Extroverted and resilient individuals often exhibit greater motivation, actively participate in treatment decisions, and utilize social and psychological resources effectively. In contrast, introverted or less adaptive individuals may encounter difficulties in adhering to treatment protocols, managing stress, or seeking support. Assessing personality traits allows for the identification of patients who may require additional psychosocial support, and this study explores how personality interacts with clinical factors to predict treatment success in cervical cancer patients [10–13].

Most previous research in cervical cancer has focused primarily on clinical predictors such as tumor stage, treatment modality, or surgical interventions, leaving the role of psychosocial variables relatively underexplored. Few studies have examined the combined influence of clinical and psychosocial factors on treatment outcomes, limiting understanding of how these variables interact to determine therapeutic success. Addressing this gap is crucial for developing comprehensive care models that integrate both medical and psychosocial dimensions, ensuring that interventions are patient-centered and tailored to individual needs. This study aims to provide a holistic evaluation of predictors of treatment success in cervical cancer patients. This study investigates disease stage, duration of illness, and personality as key variables affecting treatment outcomes. Analyzing the combined effect of these factors is expected to identify determinants that significantly contribute to therapeutic success. The findings can guide healthcare providers, particularly nurses, oncologists, and psychologists, in designing individualized care strategies that integrate clinical management with psychosocial support. Such strategies are essential for improving patient adherence, resilience, and overall quality of life during and after treatment [14,15].

Understanding the interplay between clinical indicators and psychosocial factors has broad implications for clinical practice, health policy, and future research. Simultaneous analysis of these variables supports the development of holistic care approaches that enhance treatment success, patient well-being, and overall management of cervical cancer. The present study focuses on Clinical and Psychosocial Predictors of Treatment Success in Cervical Cancer Patients: The Role of Disease Stage, Duration of Illness, and Personality, providing an evidence-based foundation for both clinical application and future studies.

2. MATERIALS AND METHODS

Design

This study was classified as analytical observational research using a cross-sectional design, which is commonly applied to examine relationships between variables at a single point in time (Rahman, 2021).

Sample and setting

The sampling technique used was total sampling, involving 135 cervical cancer patients as respondents. The inclusion criteria were: (1) cervical cancer patients who had received at least one session of cancer treatment at General Hospital Semarang; (2) patients who were willing to participate by signing informed consent; and (3) Muslim patients. The exclusion criteria were: (1) patients who were illiterate; (2) patients with decreased hearing function; and (3) patients with comorbidities such as heart disease, hypertension, kidney failure, or diabetes mellitus. These criteria were determined to ensure that respondents could understand the questionnaire, respond independently, and reduce bias from clinical complications (Ismail et al., 2022).

Variable

The independent variables in this study were stage of cervical cancer, length of illness, and personality. The dependent variable was the treatment success rate.

Instruments

In quantitative research, the credibility of a study relies on the development of instruments used to measure the underlying concepts. The measurement of a variable is designed to achieve consistency, adequacy, accuracy, precision, uniformity, and comparability in assessing and explaining a specific concept. Therefore, the measurement approach encompasses testimony and confirmation variables that function as representations of constructs [16].

Data were collected using a structured questionnaire, which was developed by the research team and adapted from relevant literature. The questionnaire consisted of five variables: stage of cervical cancer, length of illness, personality, and treatment success rate. The instrument validity test showed corrected item-total correlations in the range of 0.452–0.933, while Cronbach's alpha values ranged from 0.874 to 0.973, indicating excellent reliability (Nasution et al., 2021). All variables in this study were measured using a questionnaire, and has been granted permission to modify the instrument was obtained from the original author. Likert scale was applied, consisting of such options as strongly disagree, disagree, neutral, agree and strongly agree. The variables were ordinallly scaled with indicators ranging from 76%-100% (good), 55%-75% (enough), and lower than 55%.

Data collection

Various attempts have been made to solve any research bias with multiple inclusion and exclusion criteria, narrowing down the biases and ensuring that the criteria were satisfied for the respondents. The researcher collected the primary data for this study. A total of 135 questionnaires was distributed in April 2024. The data were collected in the following steps: (1) conduct research permits in hospitals; (2) after obtaining permission for the ethical process at the General Hospital Ethics Committee Institute; (3) pass the ethical test, the data collection process for inpatient patients who met the inclusion and exclusion criteria, patients first received an explanation from researchers about the research carried out in full, an explanation carried out orally and in writing; after the patient understands the research being conducted, the researcher requests written informed consent and then the patient who agrees to be a respondent can sign the informed consent sheet, which is in accordance with the ethical principles of research, namely informed consent, anonymity, confidentiality, fidelity, and autonomy; (4) the data that have been collected are then checked for completeness and then processed with somers'd test and ordinal logistic regression.

Data analysis

The independent variables in this study were knowledge, educational, stage of cervical cancer, length of illness, personality. The dependent variable was the treatment success rate. Bivariate analysis was conducted using Somers'd test to determine the direction and strength of associations between each independent variable and the treatment success rate. A p-value of less than 0.05 was interpreted as statistically significant, while a p-value equal to or above 0.05 indicated no significant relationship (Hartono & Siregar, 2022). Correlation strength was determined by the r-value, with higher values

indicating stronger associations. Multivariate analysis was performed using ordinal logistic regression to examine the simultaneous influence of all independent variables on treatment success. Variables with p-values less than 0.05 were considered to significantly influence treatment success, while those with higher p-values were not (Yuliyanti & Prasetyo, 2023).

Ethical consideration

This study received ethical approval from the Health Research Ethics Committee of General Hospital Semarang, with approval number 1691/KEPK-RSDK/2024, dated February 21, 2024. After obtaining institutional permissions, data were collected between April 10 and April 25, 2024, in the oncology and gynecology outpatient departments, and had obtained the participants' consent through informed consent, thus patients first received an explanation from researchers about the research carried out in full, an explanation carried out orally and in writing. After the patient understands the research being conducted, the researcher is given informed consent in writing, and then the patient who agrees to be a respondent can sign the informed consent sheet, which is in accordance with the ethical principles of research, namely informed consent, anonymity, confidentiality, fidelity, and autonomy.

3. RESULTS

Table 1 frequency distribution of knowledge, educational, and treatment success rate in cervical cancer patients in 2024 (n=135).

Variables	Category	Frequency (f)	Presentation (%)
Stage	Early stage (FIGO early stage IIA- IB1)	4	3
	Locally advanced stage (FIGO stage IB2-IIB)	53	39,3
	Advanced stage (FIGO advanced stage IIIA-IVB)	78	57,8
Total		**135**	**100**
Length of Illness	< 1 year	60	44.4
	1-2 years	52	38.5
	> 2 years	23	17.0
Total		**135**	**100**
Personality	Introvert	3	2.2
	Extrovert	132	97.8
Total		**135**	**100**
Treatment success rates	Less	11	8.1
	Enough	45	33.3
	Good	79	58.3
Total		**135**	**100**

The results of this study are reflected in Table 1 the frequency distribution results of 135 cervical cancer patients in 2024 showed that the largest proportion of patients were in the advanced stage of cervical cancer (FIGO IIIA–IVB), totaling 78 individuals (57.8%). The highest proportion based on the length of illness was patients with a disease duration of less than one year, comprising 60 individuals (44.4%). Personality characteristics were predominantly extroverted, with 132 individuals (97.8%). The highest treatment success rate was in the good category, reported in 79 individuals (58.3%).

Table 2 Analysis of the Relationship between stage of cervical cancer, length of illness, and personality with Treatment success rate in cervical cancer patients in 2024 (n=135).

Variables		Treatment success rates						*p value*	r
		Less		Enough		Good			
		f	%	f	%	f	%		
Stage of cervical cancer	Less	0	0	1	0.7	3	2.2	< 0.001	0.183
	Enough	3	2.2	18	13.3	32	23.7		
	Good	8	5.9	26	19.3	44	32.6		
Length of illness	Less	4	3	15	11.1	41	30.4	< 0.001	0,755
	Enough	5	3.7	20	14.8	27	20		
	Good	2	1.5	10	7.4	11	8.1		
Personality	Introvert	1	0.7	1	0.7	1	0.7	< 0.001	0,763
	Extrovert	10	7.4	44	32.6	78	57.8		

The analysis showed that Stage of cervical cancer was significantly related to treatment success ($p < 0.001$) but showed a weak correlation ($r = 0.183$), indicating that although the stage influenced outcomes, its predictive strength was relatively low. Length of illness had a significant association ($p < 0.001$) with a strong positive correlation ($r = 0.755$), showing that a shorter duration of illness was strongly linked to higher treatment success. Personality was also significantly associated ($p < 0.001$) with a strong positive correlation ($r = 0.763$), meaning that extroverted patients tended to achieve better treatment outcomes compared to introverted patients.

Table 3 Analysis of the Magnitude of Relationship between Stage of cervical cancer, length of illness, personality with Treatment success rate in cervical cancer patients in 2024 (n=135).

Pseudo R Square	
Cox and Snell	0.830
Nails	0.983
McFadden	0.956

The results in Table 3 illustrate the Cox and Snell Pseudo R Square value, which indicates the proportion of variance in treatment success rates that can be explained by the independent variables in the model, namely stage of cervical cancer, length of illness, and personality. The value obtained was 0.830, meaning that these three variables collectively contributed to explaining 83% of the variation in treatment success among cervical cancer patients in 2024. This high percentage reflects the substantial role of patient-related factors, such as cognitive understanding of the disease, disease progression stage, illness duration, and personality traits, in influencing the likelihood of achieving better treatment outcomes. The remaining 17% (100 − 83%) of the variation is likely attributable to other factors not examined in this study, which may include clinical interventions, treatment adherence, comorbidities, healthcare facility quality, and support systems. This finding highlights the importance of a comprehensive approach that not only focuses on medical treatment but also addresses patient education, psychosocial factors, and individualized care strategies to optimize treatment success.

4. DISCUSSION

The findings of this study revealed that stage of cervical cancer, length of illness, and personality were significantly associated with treatment success rates in cervical cancer patients. Statistical analysis indicated that the stage of cervical cancer had a significant relationship with treatment outcomes ($p < 0.001$), although the correlation was weak ($r = 0.183$). Length of illness demonstrated a significant and strong positive correlation ($p < 0.001$, $r = 0.755$), indicating that shorter illness duration was strongly associated with better treatment success. Personality also showed a significant and strong positive correlation ($p < 0.001$, $r = 0.763$), suggesting that extroverted patients had a higher likelihood of successful treatment compared to introverted patients.

The results showed that the stage of cervical cancer played an important role in determining treatment outcomes. Patients with an earlier stage of the disease had a higher chance of achieving successful treatment compared to those diagnosed at an advanced stage. Prior studies have consistently reported similar findings, where disease stage is considered one of the strongest predictors of treatment response in cervical cancer patients. These results emphasize that earlier detection is crucial to improving patient survival and treatment effectiveness. The relationship between cancer stage and treatment success has also been highlighted in several international studies. Research has demonstrated that patients diagnosed at stage I or II generally achieve higher rates of remission and long-term survival than those diagnosed at stage III or IV. Advanced-stage patients often face reduced treatment effectiveness due to extensive tumor invasion and metastasis. The current findings are in line with these observations, further reinforcing the critical importance of early screening and diagnosis in cervical cancer management [17,18].

Stage of cervical cancer influences treatment outcomes through biological and clinical pathways. Advanced-stage disease is usually associated with larger tumor size, greater lymph node involvement, and a higher probability of distant metastasis, which reduce the efficacy of standard therapies such as surgery, radiotherapy, or chemotherapy. Patients with late-stage cancer also tend to experience higher treatment-related complications, which can interfere with therapy completion. These factors collectively explain why patients with advanced stages have lower success rates compared to those with early detection. Early detection also improves treatment planning and precision. Patients diagnosed in earlier stages have more therapeutic options available, including curative surgical interventions and localized radiotherapy, which increase the likelihood of complete remission. Advanced stages, in contrast, often require systemic therapies with lower curative potential, which limits overall success. These findings highlight the importance of preventive measures, awareness programs, and routine cervical cancer screening as essential strategies for improving survival outcomes [19,20].

The length of illness was another significant factor associated with treatment success. Patients with a shorter duration of illness prior to treatment initiation had higher success rates compared to those who had experienced prolonged symptoms. The strong correlation ($r = 0.755$) confirmed that timely initiation of treatment after diagnosis is critical in cervical cancer management. Several studies support this finding, emphasizing that delayed medical consultation or treatment initiation is linked to poorer outcomes. Previous research has similarly shown that prolonged delays in diagnosis and treatment significantly reduce the likelihood of achieving remission. A study reported that patients who began treatment within weeks of diagnosis had better prognoses compared to those who delayed treatment for several months. Longer illness duration often reflects disease progression, treatment resistance, and more severe complications. The current findings strongly align with the existing evidence, highlighting the urgent need for early treatment initiation following diagnosis. The length of illness influences treatment outcomes by affecting tumor biology and patient condition. Prolonged disease duration allows for continued tumor growth, invasion, and metastasis, reducing the effectiveness of available therapies. A longer illness period also increases the risk of comorbid conditions and weakens the immune system, further lowering treatment response. Shorter illness duration ensures that the disease remains in a more manageable state, enabling treatments to achieve better results [21,22]. Timely initiation of therapy enhances patient resilience and adherence to treatment protocols. Patients who begin treatment earlier are more likely to tolerate aggressive therapies and maintain higher overall health status. Early management also prevents the accumulation of psychological stress and anxiety associated with prolonged untreated illness, which indirectly influences treatment response. These findings reaffirm the importance of promoting early healthcare-seeking behavior among women at risk of cervical cancer.

Personality traits were also found to play a significant role in treatment outcomes. Extroverted patients had higher treatment success rates compared to introverted patients. The strong correlation ($r = 0.763$) indicated that psychological and behavioral characteristics significantly influenced recovery and treatment adherence. This finding is consistent with previous studies that have shown how personality traits affect health outcomes, particularly in chronic illnesses such as cancer. Prior research has shown that extroverted individuals generally engage more actively in communication with healthcare providers, adhere better to treatment regimens, and utilize stronger social support networks. These factors improve resilience during cancer treatment, ultimately leading to better outcomes. Introverted patients, on the other hand, may experience higher levels of stress, social isolation, and reduced treatment compliance, which negatively affect treatment success. The current results align with this body of evidence, highlighting personality as an important psychosocial determinant of health outcomes [23].

Personality affects treatment outcomes through cognitive, emotional, and behavioral processes. Extroverted individuals are more likely to seek information, express their concerns, and engage with support systems, which enhance their coping strategies during treatment. They may also have a more optimistic outlook, which contributes to better psychological adjustment and biological responses to therapy. These factors collectively increase their chances of treatment success. Psychological resilience associated with extroversion enhances adherence to medical recommendations and fosters a proactive attitude toward recovery. Extroverted patients also tend to have wider social networks that provide emotional and practical support, which play a crucial role during intensive treatment periods. Conversely, introverted patients may benefit from targeted psychosocial interventions to improve their engagement and compliance. These findings suggest the need for personalized approaches in cancer care that consider personality differences among patients.

When considered simultaneously, stage of cervical cancer, length of illness, and personality explained 83% of the variation in treatment success rates. This demonstrates the strong combined impact of biological, clinical, and psychological factors in determining treatment outcomes. Earlier stage, shorter illness duration, and extroverted personality collectively improved the likelihood of successful treatment, while advanced stage, prolonged illness, and introverted traits reduced success rates. These interactions emphasize the multifactorial nature of cancer treatment outcomes.

The combination of these factors illustrates the importance of adopting a comprehensive approach in cervical cancer care. Interventions should not only target medical treatment but also address early detection, rapid initiation of therapy, and psychosocial support tailored to patient personality. Such strategies will ensure that biological and psychological determinants are effectively managed to maximize treatment success. The results reinforce the need for integrative oncology practices that balance clinical precision with patient-centered care.

Strengths and limitations

This study demonstrates notable strengths by integrating clinical and psychosocial variables that are rarely investigated simultaneously in the context of cervical cancer. The inclusion of disease stage, duration of illness, and personality provides a more comprehensive picture of the factors influencing therapeutic outcomes. The high Cox and Snell Pseudo R Square value (0.830) highlights the model's strong explanatory power, confirming that the variables studied substantially contribute to treatment success. The identification of personality traits as significant predictors represents a novel finding, as prior research has predominantly focused on clinical dimensions alone. This expands the scope of understanding by emphasizing the importance of psychosocial factors in cancer care. Furthermore, the study holds potential as a foundation

for developing multidisciplinary interventions that integrate psychological and social support into cervical cancer management, thereby bridging the gap between biomedical treatment and holistic care.

This limitation prevents the determination of whether the identified factors directly influence therapeutic success. The reliance on self-report instruments for personality assessment also raises the risk of response bias, as participants may be influenced by subjective self-perceptions or social desirability. Additionally, the relatively small sample size, confined to a single healthcare setting and a specific time frame, limits the generalizability of the findings to broader populations. Important confounding factors such as treatment adherence, family support, comorbid conditions, and the quality of healthcare services were not accounted for, which may have influenced the outcomes. These constraints indicate the need for further research using longitudinal designs, larger and more diverse samples, and objective measures to validate and expand upon the findings.

Implications

The results of this study have broad implications for clinical practice, nursing care, health policy, and psychosocial support. Clinically, the strong association between stage of cervical cancer and treatment outcomes underscores the importance of early detection and timely treatment initiation, which can be achieved through strengthened screening programs and improved access to diagnostic services. From a nursing perspective, the integration of psychosocial aspects such as personality into routine assessments is essential, as tailoring communication and support strategies to patient personality types can enhance motivation, adherence, and quality of care. At the health policy level, the findings indicate that cervical cancer management should extend beyond medical treatment, with public health initiatives focusing on community-based education, awareness promotion, and the inclusion of psychosocial services as a standard part of oncology care.

Psychosocial implications further highlight the critical role of personality as a predictor of treatment success, reinforcing the importance of holistic and multidisciplinary interventions that involve oncologists, nurses, psychologists, and social workers to optimize coping strategies and resilience. Research implications point to the need for further investigation into additional determinants of treatment outcomes, including socioeconomic status, health literacy, treatment adherence, and healthcare infrastructure. Longitudinal studies are particularly important to capture the dynamic interaction of these factors over time, thereby providing a deeper evidence base for designing comprehensive and sustainable cervical cancer management strategies.

5. CONCLUSION

The findings of this study affirm that cervical cancer stage, duration of illness, and personality are significantly associated with treatment outcomes among patients. Duration of illness and personality emerged as particularly strong predictors, with patients who had a shorter illness duration and extroverted personality traits being more likely to achieve positive therapeutic results. Although cancer stage showed only modest predictive power, it remains a crucial clinical determinant of prognosis. Collectively, these three factors accounted for 83% of the variance in treatment success, underscoring the pivotal role of patient-related factors in shaping therapeutic outcomes. These results highlight the need for a comprehensive approach to cervical cancer care that integrates medical, psychological, and social dimensions. Personalized treatment strategies that consider both clinical conditions and personality characteristics may enhance the likelihood of successful therapy. This underscores the importance of interdisciplinary collaboration in improving the overall quality of life and survival prospects of cervical cancer patients.

Declaration of Conflicting Interest

None declared

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Authors' Contributions

All authors contributed equally to all stages of the study, including making substantial contributions (conception and design or acquisition of data or analysis and interpretation of data), drafting, and revising the manuscript, giving final approval of the version to be published, and agreeing to be accountable for all aspects of the work.

Data Availability Statement

The datasets generated during and or analysed during the current study are available from the corresponding author on reasonable request.

Declaration of Generative AI

Nothing to disclose.

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