Challenges in Providing Holistic Nursing Care for Patients with Aplastic Anemia Using the Callista Roy Adaptation Model

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ABSTRACT
Aplastic anemia is a hematological disorder that has complex physiological and psychosocial impacts on patients, thus requiring a holistic nursing care approach. The Callista Roy Adaptation Model conceptualizes individuals as adaptive systems who respond to various stimuli through coping mechanisms in order to achieve equilibrium. This scientific study aimed to describe the application of the Roy Adaptation Model in nursing care for a patient with aplastic anemia accompanied by gastrointestinal bleeding. The study employed a case report design using the nursing process approach, including assessment, diagnosis, planning, implementation, and evaluation based on Roy's four adaptive modes: physiological–physical, self-concept, role function, and interdependence. The results of nursing care indicated that the management of focal stimuli in the form of bleeding, as well as contextual and residual stimuli influencing the patient's psychological condition, facilitated more positive adaptive responses. Nursing interventions in the physiological–physical mode contributed to the stabilization of the patient's condition, while supportive approaches, therapeutic communication, and education in the self-concept mode helped reduce anxiety and improve self-acceptance. Support for role function and interdependence through family involvement strengthened the patient's adaptation process during treatment. In conclusion, the Roy Adaptation Model is effective as a conceptual framework for nursing care in patients with aplastic anemia, as it integrates physiological, psychological, and social aspects comprehensively.
Keywords: aplastic anemia; Roy adaptation model; holistic nursing care; case report; anxiety

INTRODUCTION
Aplastic anemia is a hematological disorder caused by bone marrow failure to produce erythrocytes, leukocytes, and platelets, resulting in pancytopenia with major clinical manifestations including severe fatigue, increased susceptibility to infection, and life-threatening bleeding risk [1, 2]. The reduction in all blood cell lineages leads not only to physiological instability but also to significant functional limitations that may disrupt patients' daily activities, physical endurance, and social participation. Consequently, the disease has a profound impact on health-related quality of life, particularly among individuals of productive age who are still actively engaged in work and family responsibilities [3, 4].

Epidemiologically, the incidence of aplastic anemia is estimated at approximately 2–5 cases per million population per year, with higher rates reported in Asian countries compared with Western regions. This distribution suggests that the burden of the disease may be more substantial in countries such as Indonesia, where access to specialized hematology services, transfusion facilities, and long-term monitoring may vary across healthcare settings [5, 6]. In addition to its rarity, aplastic anemia presents major clinical challenges due to its chronic course, unpredictable progression, and the need for continuous evaluation of hematological parameters. Patients frequently require repeated hospitalization, transfusion therapy, immunosuppressive treatment, or bone marrow transplantation, all of which contribute to physical exhaustion, emotional distress, and financial strain for both patients and families.

The complexity of aplastic anemia becomes even more critical when accompanied by complications such as gastrointestinal bleeding. This condition increases the risk of hemodynamic instability, necessitates intensive monitoring, and requires collaborative management involving transfusion therapy, pharmacological intervention, and prevention of recurrent bleeding episodes [1]. Beyond the physiological threats, recurrent bleeding episodes often intensify patients' fear of deterioration, uncertainty about prognosis, and dependency on hospital care, thereby reinforcing psychological vulnerability and social disruption.

In clinical practice, nursing care for complex hematological conditions is often oriented toward physiological stabilization and monitoring of medical indicators, including hemoglobin levels, platelet counts, and signs of bleeding. While these aspects are essential, patients' psychological and social responses are not always systematically assessed or managed. Individuals with aplastic anemia frequently experience anxiety, uncertainty regarding long-term treatment plans, fear of complications, and role conflict resulting from prolonged hospitalization and reduced functional capacity. Such responses may trigger maladaptive behaviors, including refusal of procedures due to previous traumatic experiences, decreased adherence to treatment recommendations, and limited readiness to undergo continued therapy or referral processes [7, 8]. If these psychosocial dimensions are not addressed, the effectiveness of clinical management may be compromised, and patients' adaptive capacity may decline.

These conditions highlight the importance of using a conceptual nursing framework that enables nurses to integrate the management of acute physiological problems with patients' psychosocial adaptation needs. A structured theoretical approach may help nurses systematically identify adaptive problems, determine priority interventions, and evaluate patient responses in a comprehensive manner. Without such a framework, nursing care risks becoming fragmented, overly task-oriented, and insufficiently responsive to the multidimensional needs of patients with chronic hematological disorders.

The Callista Roy Adaptation Model conceptualizes individuals as adaptive systems who respond to focal, contextual, and residual stimuli through regulator and cognator coping mechanisms. These responses are reflected in 4 adaptive modes: physiological–physical, self-concept, role function, and interdependence [9]. This model is particularly relevant to aplastic anemia cases because it allows nurses to examine patients' adaptive responses holistically. Through the physiological–physical mode, nurses can address hemodynamic instability and bleeding risk; through the self-concept mode, they can assess anxiety, emotional responses, and body perception; through the role function mode, they can evaluate changes in family and occupational roles; and through the interdependence mode, they can identify the need for social support and therapeutic relationships during treatment [10].

Despite its relevance, the systematic application of the Roy Adaptation Model in nursing care for patients with aplastic anemia has rarely been documented in Indonesia. In many clinical settings, theory-based nursing practice is still underutilized, even though conceptual models are essential for strengthening professional reasoning, ensuring consistency of care, and producing measurable and replicable nursing outcomes [9]. Case-based scientific reports therefore play an important role in demonstrating how theoretical models can be translated into clinical decision-making and practical nursing interventions.

Accordingly, this case report was developed to describe the challenges of providing holistic nursing care for a patient with aplastic anemia and to illustrate the implementation of the Roy Adaptation Model in facilitating adaptive responses during hospitalization at Tugu Koja Regional

General Hospital. By presenting the integration of theoretical concepts with clinical practice, this report aims to contribute to the development of theory-guided nursing care in hematological settings.

This study aimed to describe the implementation of nursing care based on the Roy Adaptation Model in addressing practical challenges encountered in patients with aplastic anemia, particularly the limitations of holistic approaches that have traditionally been dominated by physiological focus. Specifically, this study sought to demonstrate how this approach assists nurses in identifying and managing patients' adaptive responses across physical, psychological, and social domains, thereby improving the overall quality of comprehensive nursing care.

METHODS

This scientific study employed a descriptive case report design using the nursing process approach to illustrate the implementation of nursing care based on the Callista Roy Adaptation Model in a patient with aplastic anemia. This design was selected because it allows an in-depth exploration of the patient's adaptive responses to physiological, psychological, and social changes experienced during hospitalization [11-14]. The study was conducted in the internal medicine inpatient ward of Tugu Koja Regional General Hospital from 15–17 October 2025, with an observation period of 3 × 24 hours. The study subject was one adult patient diagnosed with aplastic anemia, selected purposively based on the criteria of being conscious, able to communicate effectively, and willing to participate in the full nursing care process during the study period.

The main variable in this study was the patient's adaptive response based on the Roy Adaptation Model, encompassing four adaptive modes: physiological–physical, self-concept, role function, and interdependence [9]. Data were collected through structured interviews with the patient and family, direct observation of the patient's physical condition and psychological responses, physical examination, and review of medical documentation, including laboratory results, clinical notes, and administered therapies. The assessment was structured according to the Roy Adaptation Model by identifying focal, contextual, and residual stimuli influencing the patient's responses. The data were then classified into the four adaptive modes to determine nursing problems [10].

The nursing process was implemented systematically, including assessment, diagnosis, intervention planning, implementation, and evaluation of nursing outcomes. Nursing diagnoses, interventions, and outcomes referred to the Indonesian Nursing Diagnosis Standard (SDKI), Indonesian Nursing Intervention Standard (SIKI), and Indonesian Nursing Outcome Standard (SLKI). Data analysis was conducted using descriptive qualitative analysis by comparing the patient's condition before and after nursing interventions across the four adaptive modes in order to evaluate changes in adaptive responses during the care period.

RESULTS

Overview of the patient and initial condition

Mr. S (40 years old) was admitted to the internal medicine inpatient ward of Tugu Koja Regional General Hospital with a medical diagnosis of aplastic anemia accompanied by upper gastrointestinal bleeding (hematemesis–melena). The chief complaints were black-colored vomiting and tarry black stools for several days, accompanied by weakness and a history of recurrent epistaxis. Physical examination revealed anemic conjunctiva, generalized pallor, and epigastric tenderness. Initial laboratory findings showed hemoglobin 6.1 g/dL, erythrocytes 2,490/mm^3, leukocytes 4,400/mm^3, and platelets 80,000/mm^3. Vital signs were relatively stable (BP 132/77 mmHg, pulse 96 beats/min, RR 20 breaths/min, temperature 36.5°C, SpO_2 98% on room air). The patient received transfusion therapy with two units of packed red cells. At the beginning of hospitalization, the patient refused nasogastric tube insertion due to a previous traumatic experience and expressed a desire to go home because of family responsibilities and concerns regarding referral for endoscopic examination.

Identification of stimuli based on the Roy Adaptation Model

The stimuli influencing the patient's responses were identified as focal stimuli in the form of gastrointestinal bleeding and severe anemia; contextual stimuli including chronic illness, hospitalization, and family responsibilities; and residual stimuli consisting of previous trauma related to nasogastric tube insertion. These findings indicate that clinical and psychosocial problems occurred simultaneously and required nursing management that extended beyond physiological stabilization alone. Table 1 indicates that the focal stimulus posed an immediate physiological threat, whereas contextual and residual stimuli intensified the patient's psychological responses, particularly anxiety and resistance to treatment, thereby increasing the risk of non-adherence if care were focused solely on medical aspects.

Table 1. Patient stimuli based on the Roy Adaptation Model

Stimulus category	Main patient data	Implications for adaptive response
Focal stimulus	Hematemesis–melena, Hb 6.1 g/dL	Risk of ongoing bleeding and decreased perfusion
Contextual stimulus	Chronic illness, hospitalization, responsibility for children and work	Intensifies psychological stress and role conflict
Residual stimulus	Previous trauma related to NGT insertion	Triggers treatment refusal and anxiety

Patient responses in the Four Roy Adaptive Modes

The patient's adaptive responses were classified into the four adaptive modes. In the physiological–physical mode, dominant maladaptive responses were observed in the hematological and gastrointestinal systems, including severe anemia, signs of bleeding, and weakness. In the self-concept mode, the patient demonstrated anxiety and loss of control due to uncertainty about the treatment plan and previous procedural trauma. In the role function mode, the patient experienced role conflict as the family head because he felt unable to fulfill his responsibilities. In the interdependence mode, the patient received support from his wife, who accompanied him, although anxiety remained regarding dependence on the healthcare system and referral procedures. Table 2 shows that maladaptation occurred not only in the physiological mode but also strongly in the self-concept and role function modes, while the interdependence mode appeared relatively more adaptive due to family support, although facilitation of communication and education was still required.

Table 2. Patient responses according to the four Roy adaptive modes

Adaptive mode	Main findings	Response category
Physiological–physical	Low Hb, hematemesis–melena, pallor, weakness, epigastric pain	Predominantly maladaptive
Self-concept	Anxiety, refusal of NGT, desire to go home, confusion about follow-up plan	Predominantly maladaptive
Role function	Role conflict as father/family head, concern about children's care	Predominantly maladaptive
Interdependence	Wife present, requires informational and emotional support	Partially adaptive

Nursing Diagnoses and Nursing Interventions

Based on the assessment findings, three main nursing diagnoses were established: risk of bleeding, anxiety, and risk for situational low self-esteem. Interventions focused on bleeding prevention and close monitoring of clinical parameters, reduction of anxiety through therapeutic communication and education, and role support with reinforcement of self-concept through family involvement and facilitation of adaptive role adjustment. Table 3 indicates that the three diagnoses were interrelated: risk of bleeding represented the primary physiological priority, whereas anxiety and risk for situational low self-esteem emerged as direct consequences of disease uncertainty, traumatic experience, and disruption of role function.

Table 3. Nursing diagnoses and intervention focus

Nursing diagnosis	Main supporting data	Nursing intervention focus
Risk of bleeding (D.0012)	Hematemesis–melena, epistaxis, platelets 80,000/mm³, Hb 6.1 g/dL	Bleeding monitoring, vital sign monitoring, transfusion collaboration, danger sign education
Anxiety (D.0080)	Refusal of NGT, desire to go home, confusion about referral plan, restlessness	Therapeutic communication, education on care plan, relaxation techniques, family involvement
Risk for situational low self-esteem (D.0074)	Feeling unable to perform roles, downward gaze, dependence on wife	Role adaptation support, reinforcement of positive abilities, gradual promotion of independence

Evaluation and Nursing Outcomes

After 3 × 24 hours of nursing care, outcomes demonstrated improvement in both physiological and psychological aspects. The patient no longer experienced hematemesis or melena, and the general condition improved. Hematological parameters increased following transfusion and intensive monitoring. Psychologically, the patient appeared calmer and was able to accept explanations regarding the treatment plan, although reinforcement of information for follow-up care was still needed. In terms of self-concept and role function, the patient showed improved self-acceptance, greater cooperativeness, and increased readiness to continue treatment with family support. Table 4 demonstrates a consistent pattern in which physiological stabilization occurred alongside improvement in psychological adaptive responses. These changes indicate that simultaneous management of stimuli across the four adaptive modes facilitated the patient's movement from maladaptive toward more adaptive responses.

Table 4. Changes in patient condition before and after 3 × 24 hours of nursing care

Outcome aspect	Before intervention	After 3 × 24 hours
Signs of bleeding	Hematemesis–melena, history of epistaxis	No hematemesis/melena, bleeding decreased
General condition	Pale, weak, anxious, wanted to go home	More stable, calmer, more cooperative
Anxiety	Anxious, refused certain procedures, confused about follow-up plan	Anxiety decreased, understands treatment plan, still requires reinforcement
Self-concept and role	Felt unable to perform role, fearful of procedures	Improved self-acceptance, better recovery motivation
Family support	Wife present	Family support maintained, more involved in care

DISCUSSION

Nursing care for patients with aplastic anemia accompanied by gastrointestinal bleeding in this study demonstrates that the application of the Roy Adaptation Model developed by Callista Roy can facilitate the patient's holistic adaptive process, encompassing both physiological and psychosocial domains. The model conceptualizes the individual as an adaptive system that continuously responds to internal and external stimuli through regulator and cognator coping mechanisms in order to achieve equilibrium [10]. In this case, pathological stimuli in the form of pancytopenia and active bleeding represented the primary threats to the patient's physiological integrity. At the same time, hospitalization, disruption of family roles, and prior traumatic experiences functioned as contextual and residual stimuli that intensified the patient's psychological responses. These findings illustrate that clinical and psychosocial problems are closely interconnected and cannot be managed in isolation; therefore, a holistic nursing approach is highly relevant in the management of complex hematological conditions [15].

Within the physiological–physical mode, nursing interventions focusing on close monitoring, hemodynamic stabilization, and bleeding prevention were shown to effectively support the patient's physiological adaptation. The emergence of adaptive responses reflects activation of the regulator subsystem, through which the body attempts to maintain internal balance via compensatory biological mechanisms. This observation is consistent with Roy's theoretical assumption that successful physiological adaptation indicates effective functioning of the regulator processes in preserving biological integrity [10]. The present findings align with previous studies reporting that implementation of the Roy Adaptation Model in patients with chronic illness is associated with improved physiological stability, reduced complications, and better overall quality of life [16, 17]. Extending these observations, the current study suggests that the model may be particularly valuable in acute-on-chronic hematologic instability, where rapid physiological deterioration requires continuous adaptive regulation.

In the self-concept mode, the patient's anxiety represented a normal response to threats to self-integrity, uncertainty regarding disease prognosis, and memories of earlier traumatic health experiences. Nursing interventions in the form of therapeutic communication, emotional reassurance, and structured health education appeared to activate cognator coping processes, enabling the patient to reinterpret the illness experience more adaptively. The observed reduction in anxiety indicates that the patient gradually developed a sense of self-control and trust in healthcare providers. This supports earlier research demonstrating that nursing care guided by the Roy Adaptation Model contributes to decreased anxiety levels, improved self-acceptance, and stronger psychological resilience among individuals with chronic or life-threatening conditions [18, 19]. Moreover, these results emphasize the importance of cognitive reframing and meaning-making in promoting adaptive responses to severe illness.

In the role function mode, disruption of the patient's role as family head and primary income provider emerged as a major stressor. Inability to fulfill expected social responsibilities negatively affected the patient's self-esteem, sense of usefulness, and motivation for recovery. Nursing strategies that emphasized recovery as a strategic pathway toward regaining social participation were found to help the patient reconstruct a more positive self-perception. This adaptive response is consistent with prior studies showing that application of the Roy Adaptation Model enhances patients' capacity to renegotiate and reintegrate social roles following chronic illness or hospitalization [20]. These findings highlight that role restoration is not merely a social outcome but also a psychological driver of recovery, reinforcing the importance of addressing role identity during nursing care.

Within the interdependence mode, family support functioned as a crucial contextual stimulus in the patient's adaptive process. The continuous presence of the patient's spouse during hospitalization strengthened emotional support systems, enhanced the patient's sense of safety, and contributed to improved coping capacity. Therapeutic communication among nurses, the patient, and family members acted as a positive environmental stimulus that promoted adaptive coping responses. This observation is consistent with family nursing theories emphasizing that

family involvement in the care process improves both adaptive outcomes and clinical recovery [21, 22]. It also underscores that adaptive success is not solely an individual achievement but a relational process shaped by interpersonal support systems.

Overall, the results of this study indicate that the Roy Adaptation Model is effective as a conceptual framework for identifying stressors, understanding adaptive response patterns, and designing targeted, comprehensive nursing interventions. The model enables nurses not only to focus on physical stabilization but also to simultaneously address psychological and social dimensions of patient care in an integrated manner [7, 10]. By structuring assessment and intervention across the four adaptive modes, the model provides a systematic pathway for delivering person-centered, theory-guided, and evidence-informed nursing care.

Nevertheless, several limitations should be considered. The single case study design restricts generalization of the findings to broader patient populations. In addition, evaluation of psychological adaptation and role function remained largely subjective and was not supported by standardized psychometric instruments. Future studies are therefore recommended to employ quantitative or mixed-method designs with larger samples and validated measurement tools in order to assess each of Roy's adaptive modes more objectively and strengthen the empirical basis for theory-guided nursing practice.

CONCLUSION

The Roy Adaptation Model supported holistic adaptation in a patient with aplastic anemia and gastrointestinal bleeding by guiding stimulus management and coping across the physiological, self-concept, role function, and interdependence modes. The model helped nurses prioritize physiological stabilization while addressing anxiety, role conflict, and family support needs, leading to more adaptive responses during hospitalization. It remains a useful framework for comprehensive assessment, targeted intervention, and bio-psycho-social outcome evaluation. Further implementation should be strengthened through nurse training in stimulus-based assessment and integration with national nursing standards in Indonesia. Future studies with larger samples and standardized instruments are needed to confirm its effectiveness.

Ethical consideration, competing interest and source of funding

-This study adhered to ethical principles of nursing research, including autonomy, beneficence, non-maleficence, and confidentiality of patient data. Ethical approval for the study was obtained through informed consent from the patient and formal permission from the relevant institution prior to data collection.
-There is no conflict of interest related to this publication.
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