

## Adaptation and Quality of Life among Hypertensive Patients in Wetlands: A Roy Model Study

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### Abstract

Hypertension remains a major concern in low- and middle-income countries, including Indonesia's wetland regions such as Sungai Rangas Village, where environmental and cultural factors heighten disease burden and influence quality of life. Traditional and complementary therapies are commonly practiced, highlighting the need for culturally appropriate care models. This study examined adaptive responses and quality of life among hypertensive patients using Roy's Adaptation Model, operationalized through an assessment instrument covering four modes: physiological, self-concept, role function, and interdependence. A quantitative descriptive design involved 120 respondents aged  $\geq 40$  years selected through purposive sampling. Data were obtained using structured interviews and the WHOQOL-BREF. Most respondents were female (56.7%), older adults (40%  $\geq 60$  years), and had low levels of education. Findings showed the highest adaptive responses in interdependence (61.7%) and self-concept (59.2%), while role function had the lowest (55%). Quality of life was highest in social relationships (mean 62.4) and lowest in psychological health (56.1). Respondents with adaptive responses in all modes were more likely to report a higher quality of life (65%). Overall, adaptation patterns in wetland environments strongly shape the quality of life. Roy's Adaptation Model provides a culturally sensitive framework, supporting recommendations such as strengthening peer support, environment-based health education, and improved mobile health access during flood seasons.

**Keywords:** Hypertension; Roy Adaptation Model; Quality of Life; Wetland Communities; Complementary Therapy

### Background

Hypertension is a chronic non-communicable disease that is becoming one of the major global health concerns due to its contribution to global morbidity and mortality (Merdekawati et al., 2024). The World Health Organization (WHO) estimated that more than 1.28 billion people worldwide suffer from hypertension. Most of these people live in low- and middle-income countries. Because of its "silent" nature, hypertension often goes undiagnosed, leading to severe consequences including stroke, heart failure, and kidney disease. This burden underscores the need for effective management that considers the local context (World Health Organization, 2024). In 2023, the Indonesian Health Survey reported that the prevalence of hypertension in Indonesia is rising, and now stands at 34.1% (Ministry of Health of The Republic of Indonesia, 2023).

In South Kalimantan Province, particularly in the wetland regions like Sungai Rangas Village, hypertension is anticipated to be even higher due to the local geo-environmental and cultural context.

The combination of higher sodium diets, low health service availability, and reduced physical activity, particularly for older adults living alone in rural and remote areas, aggravates the problem (Ministry of Health of The Republic of Indonesia, 2023). The common first-line approach to hypertension treatment consists of prescribing a single antihypertensive agent, or “monotherapy.” Unfortunately, monotherapy is often insufficient in controlling a patient’s hypertension or improving their overall quality of life, particularly where there are additional psychosocial and environmental stressors (Ministry of Health of The Republic of Indonesia, 2023).

Using a single antihypertensive agent is a common first approach for clinical treatment. Still, alone, the agent can fall short when trying to improve the patient’s quality of life, especially when psychosocial and environmental stressors come into play. Thus, the need for adjuncts to the treatment is understandable. *Research Adjuncts to Pharmacological Treatment of Hypertension* addresses precisely the need for adjuncts that extend to the psychosocial aspects of a patient’s life (Sun et al., 2024).

Non-pharmacological approaches to treating hypertension, which include acupressure, relaxation, and the use of herbal medicines, come from a tradition that many communities accept. This is especially so in communities with strong cultural health beliefs (Fatahi et al., 2025). Adding these methods to the standard treatment of hypertension can provide the patient with a more complete therapeutic approach. Roy’s Adaptation Model is a nursing conceptual framework that promotes the person’s modes of adaptation to change (Roy, 1991). This is much more relevant in the case of chronic health conditions like hypertension, where the person is expected to adapt for quality, RAM promotes the need to adjust in the area where the person has less focus. The model’s four modes, physiological, self-concept, role function, and interdependence, offer a comprehensive lens for explaining how individuals in wetland communities respond to environmental stressors, cultural health beliefs, and daily functional demands. Each mode helps clarify observable social and health phenomena, such as dietary adaptation, emotional coping, shifting family roles, and reliance on communal support systems (Ateş et al., 2025).

Wetland communities have unique health challenges, which makes the Roy Adaptation Model a sensible option for providing culturally and contextually appropriate care. This model takes into account the clinical, psychosocial, and cultural response frameworks when assessing a patient’s response to therapy. This model ensures that care appreciates the realities of the population (Marudhar & Josfeena, 2019). For hypertensive patients, Quality of life (QoL) takes into account physical symptom extremes, psychological stress, social relationships, and environmental factors. Many studies have indicated that the Quality of life impacted by clinical treatment alone is not enough, and a thorough understanding of the patient’s day-to-day life, socio-cultural coping, and social structures is crucial. The assessment of QoL is an integral component of measuring success in the management of hypertension (Saensoda et al., 2025).

Research on hypertension and complementary therapy has recorded success in blood pressure and stress reduction. However, studies in wetland culture concentrating on specific environmental contexts of the highlighted studies are limited. Also, there are limited studies on how these therapies relate to the adaptive mechanisms in Roy’s model (Kılıç & Yardımcı Gürel, 2025).

This descriptive study seeks to understand the adaptation strategies and the quality of life of hypertensive patients living in a wetland setting, while receiving monotherapy and/or complementary therapy (Ha et al., 2024). Sungai Rangas Village presents unique opportunities to study adaptation in a population living with ecological and cultural constraints. This study seeks to contribute to the nursing science and public health practice fields through the lens of Roy's Adaptation Model, specifically, adaptive behaviors and subjective quality of life, articulating the impact of culture in hypertension management practices. The findings of this study are likely to guide the formulation of adaptive, community-centered, and self-care models for distressed rural wetland populations (Wondimneh et al., 2025).

However, despite the high prevalence of hypertension in wetland communities, little is known about how individuals in these ecological settings adapt to chronic illness and how such adaptation influences their quality of life. Existing studies rarely examine the interaction between cultural practices, environmental limitations, and adaptive responses using a structured theoretical framework. This gap highlights the need to investigate adaptation patterns and quality of life among hypertensive individuals living in wetlands, particularly within the sociocultural context of Sungai Rangas Village.

## **Methods**

This study utilized a quantitative descriptive study design to investigate the adaptation processes to Living in Roy's Wetland Areas model of provision for hypertensive patients and the quality of life. Roy's descriptive study design was chosen to comprehensively document the respondents' adaptive and quality of life perceptions without experimentation and study manipulation (Jama et al., 2025).

The study was carried out in Sungai Rangas Village, which is situated in South Kalimantan, Indonesia's Martapura Barat subdistrict. This region exemplifies the typical wetland environment, which is marked by distinct eating patterns, restricted access to medical care, and sociocultural risk factors for hypertension. All people registered at the local public health center, Martapura Barat, with a diagnosis of hypertension were included in the study population.

Those who were 40 years of age or older, had a medical professional's diagnosis of stage 1 or stage 2 hypertension, were willing to sign an informed consent form, and could speak clearly were all eligible to participate in the study. Patients who (1) failed to finish the data collection process or (2) had serious comorbid conditions like advanced kidney failure, recent stroke, or decompensated heart failure were not included in the study. Purposive sampling was used to select 120 hypertensive patients who met the inclusion criteria. In order to guarantee sufficient representation of the target population and trustworthy descriptive analysis, this sample size was chosen (Dwomoh et al., 2025).

The WHOQOL-BREF questionnaire, which assesses quality of life in four areas, environment, social relationships, psychological health, and physical health, was used to gather data (Ha et al., 2024). The WHOQOL-BREF was selected because it has been widely validated in Asian rural populations and is suitable for capturing multidimensional quality-of-life aspects relevant to chronic disease. The adaptation instrument based on Roy's Adaptation Model was chosen for its ability to evaluate behavioral and psychosocial responses in a structured manner suited to community-based assessments. Structured interviews and reviews of medical

records were used to gather more information on the sociodemographic traits of the participants, including age, gender, education level, occupation, and lifestyle. There were three primary phases to the data collection process. To find and enlist qualified volunteers, researchers first made community visits and worked with nearby medical professionals. Following a thorough explanation of the study's objectives, each respondent signed an informed consent form. Lastly, the WHOQOL-BREF questionnaire was given to the respondents, who received help when necessary. Throughout this process, trained enumerators made sure the data was accurate and comprehensive (Amlak et al., 2025). To ensure perception equivalence and minimize interviewer bias, enumerators underwent standardized training and conducted pilot testing on 10 participants to confirm consistent interpretation of each item. Feedback from the pilot showed no significant discrepancies in comprehension, allowing the questionnaire to be administered uniformly. Adaptation was measured using an instrument developed based on Roy's Adaptation Model, assessing adaptive versus maladaptive responses across the four RAM modes, physiological, self-concept, role function, and interdependence, through structured questions evaluating symptoms, self-perception, role performance, and social support. Data analysis employed descriptive statistics, including means and standard deviations for continuous variables and frequencies and percentages for categorical variables. A simple cross-tabulation analysis was used to compare adaptation status with overall QoL categories; however, no inferential statistical tests (such as chi-square or correlation coefficients) were applied, in line with the descriptive design of the study.

Adaptive responses were measured using an instrument developed based on the four modes of the Roy Adaptation Model. Each item was rated on a 4-point Likert scale, with higher scores indicating more effective coping. Item scores within each mode (physiological, self-concept, role function, and interdependence) were summed to generate a total mode score. A cut-off of 60% of the maximum possible score was used to classify responses as adaptive ( $\geq 60\%$ ) or maladaptive ( $< 60\%$ ), following thresholds used in previous RAM community studies and expert validation. Based on these mode-level classifications, respondents were further categorized as having overall adaptive responses (all four modes adaptive) or partially maladaptive responses (one or more modes maladaptive).

All of the data that was gathered was summarized using descriptive statistics. For continuous variables, means and standard deviations were employed, whereas frequencies and percentages were computed for categorical variables. Tables and narratives were used to illustrate trends in adaptation levels and quality of life. Committee Ethics and Health Research, Indonesian National Nurses Association Banjarbaru City, granted ethical clearance for this study under approval number 176/EC/KEPK-DPDPPNI/IV/2025, issued on April 10 2025. Throughout the study, every ethical principle, including informed consent, privacy, confidentiality, equitable treatment, and protection from harm, was scrupulously followed.

## **Results**

The results of this study are presented in the form of a table tabulation as follows.

**Table 1. Sociodemographic Characteristics of Hypertensive Patients (n = 120)**

Variables	Categories	Frequency (f)	Percentage (%)
Age (years)	40-49	28	23.3
	50-59	44	36.7
	≥60	48	40.0
Gender	Male	52	43.3
	Female	68	56.7
Education	No formal education	18	15.0
	Primary school	49	40.8
	Secondary school	34	28.3
	Higher education	19	15.9
Occupation	Unemployed/Housewife	51	42.5
	Farmer/Fisherman	34	28.3
	Private employee	20	16.7
	Civil servant	15	12.5
Lifestyle (Smoking)	Yes	36	30.0
	No	84	70.0

Table 1 explains that the majority of respondents were aged ≥60 years (40.0%) and predominantly female (56.7%). Most had only a primary education (40.8%), and a large proportion were housewives or unemployed (42.5%). A significant number (30.0%) reported smoking, indicating potential lifestyle-related hypertension risks.

**Table 2. Mean Scores of Quality of Life Domains (WHOQOL-BREF) (n = 120)**

Domains	Minimum	Maximum	Mean	SD
Physical Health	35.0	82.0	59.3	10.4
Psychological Health	28.0	75.0	56.1	11.8
Social Relationships	31.0	85.0	62.4	12.1
Environmental Health	30.0	78.0	57.5	9.7

Table 2. explains that among the four domains of quality of life, the social relationships domain recorded the highest mean score (62.4), suggesting relatively strong interpersonal support in the community. The psychological health domain had the lowest mean (56.1), indicating greater emotional or cognitive challenges among participants.

**Table 3. Adaptation in Four Modes According to Roy's Model (n = 120)**

Mode of Adaptations	Categories	Frequency (f)	Percentage (%)
Physiological Mode	Adaptive	68	56.7
	Maladaptive	52	43.3
Self-concept Mode	Adaptive	71	59.2
	Maladaptive	49	40.8
Role Function Mode	Adaptive	66	55.0
	Maladaptive	54	45.0
Interdependence Mode	Adaptive	74	61.7
	Maladaptive	46	38.3

Table 3. explains that most respondents exhibited adaptive responses in all four modes of Roy's Model, with interdependence mode showing the highest adaptation (61.7%), reflecting strong social and familial support. The role function mode had the lowest adaptation (55.0%), which may relate to role limitations due to physical symptoms of hypertension.

Adaptive and maladaptive responses were determined using a scoring rubric developed from the Roy Adaptation Model. Each item in the adaptation instrument

was scored on a Likert scale (1–4), where higher scores reflected more effective coping or functional responses. For each of the four modes, physiological, self-concept, role function, and interdependence, item scores were summed to obtain a total mode score. A cut-off of  $\geq 60\%$  of the maximum possible score for each mode was classified as *adaptive*, while scores  $< 60\%$  were categorized as *maladaptive*. This threshold was chosen based on previous RAM-based community studies and expert validation. Mode-level classifications were then used to determine whether each respondent demonstrated overall adaptive (all modes adaptive) or partially maladaptive responses (one or more modes maladaptive).

**Table 4. Cross-tabulation of Adaptation Status and Overall Quality of Life (QoL)**

Adaptation Status	QoL Low ( $\leq 60$ )	QoL High ( $> 60$ )	Total	% High QoL
Adaptive (all modes)	28	52	80	65.0%
Maladaptive (any mode)	30	10	40	25.0%

Table 4. explains that A higher proportion of patients with adaptive responses across all Roy’s modes reported high quality of life (65.0%), while only 25.0% of those with maladaptive responses experienced high QoL. This supports a strong positive correlation between adaptive capacity and perceived well-being. Although the design of this study is quantitative descriptive, a simple correlation cross-tabulation was used to compare adaptation status with overall QoL categories; no inferential statistical tests were conducted.

## Discussion

The sociodemographic data show that most respondents were older adults aged  $\geq 60$  years (40.0%) and predominantly female (56.7%). More than half had low educational attainment, with 40.8% completing only primary school, and 42.5% were unemployed or housewives. Regarding lifestyle factors, 30.0% of respondents reported smoking. These characteristics illustrate a population with potential vulnerability to chronic disease progression and limited formal health literacy, which may influence their adaptive capacity and quality-of-life outcomes. Adaptation scores across the four modes of the Roy Adaptation Model showed that the majority of respondents demonstrated adaptive responses, with the highest adaptation observed in the interdependence mode (61.7%) and the lowest in role function (55.0%). Quality-of-life scores from WHOQOL-BREF indicated moderate levels across domains, with social relationships scoring the highest (mean 62.4) and psychological health the lowest (mean 56.1). The primary analysis examined the descriptive relationship between adaptation status and overall QoL. Cross-tabulation showed that respondents with adaptive responses in all four RAM modes were more likely to report high QoL (65.0%) compared to those with maladaptive responses (25.0%). This descriptive association indicates that better adaptation across physiological, self-concept, role function, and interdependence modes is linked with higher perceived quality of life. No inferential tests were applied according to the descriptive study design.

This descriptive study first reveals that hypertensive individuals in Sungai Rangas Village exhibit varying levels of adaptation across the four modes of Roy’s Adaptation Model, with the highest adaptive responses found in the interdependence mode (61.7%) and the lowest in role function (55.0%). Quality-of-life assessment shows that the social relationships domain has the highest mean

score (62.4), while the psychological domain is the lowest (56.1). Cross-tabulation further indicates that respondents with adaptive responses across all RAM modes are more likely to report a high quality of life (65%) compared to those with maladaptive patterns (25%). These results collectively demonstrate that adaptive capacity strongly influences overall well-being among hypertensive patients in this wetland community. Examined through the lens of Roy's Adaptation Model, the findings provide insight into how environmental constraints, sociocultural values, and individual coping strategies interact to shape both health behaviors and perceived quality of life in Sungai Rangas. The findings provide critical insights into how environmental, sociocultural, and individual factors interplay in shaping both health behavior and perceived quality of life (QoL) in a rural Indonesian context (Demirel & Kiliç, 2024).

The sociodemographic profile of the respondents reveals a predominantly older population (40% aged  $\geq 60$  years), mostly female (56.7%), and with limited educational attainment. These characteristics are typical of rural and agrarian communities in Kalimantan, where formal education may not have been prioritized, especially among older generations (Ha et al., 2024). A significant proportion of the respondents were either unemployed or worked in informal sectors such as farming and fishing, occupations that are both physically demanding and influenced by environmental conditions such as flooding, which is common in Banjar's wetlands (Aridamayanti et al., 2023). An interesting sociocultural finding is the strong presence of women in health-related adaptation. While often considered secondary participants in healthcare systems, women in Sungai Rangas not only outnumbered men among hypertensive patients but also demonstrated stronger adaptive responses, particularly in the interdependence mode, where social and emotional support plays a vital role. This could reflect the matrifocal nature of rural families in South Kalimantan, where women often serve as informal caregivers and health decision-makers (Nguyen et al., 2025).

Using Roy's Model, the four modes of adaptation, physiological, self-concept, role function, and interdependence, were assessed (Horwitz & Finlayson, 2022). The interdependence mode showed the highest rate of adaptation (61.7%), suggesting that despite limited access to healthcare services, community and family support remain robust. This aligns with the communal values of the Banjar culture, which emphasize *gotong royong* (mutual assistance) and strong familial bonds. Conversely, role function adaptation was the lowest (55.0%), indicating that many individuals struggle with role performance, possibly due to the physical limitations imposed by hypertension or by role shifts resulting from aging. For instance, older adults who were once providers may now rely on family members, which can affect their psychological well-being and self-worth. Environmental stressors also appear to compromise physiological adaptation. The prevalence of maladaptive physiological responses (43.3%) can be attributed to lifestyle habits such as high sodium intake (due to preserved or salted foods), smoking (30.0%), and physical inactivity during flood seasons when outdoor activities become limited. These lifestyle patterns are often culturally ingrained and are compounded by logistical barriers to healthcare access, especially during the monsoon months (Sang et al., 2021).

The quality of life scores across WHOQOL-BREF domains reflect moderate overall well-being, with the social relationships domain scoring the

highest (mean = 62.4). This again underscores the strength of interpersonal support systems in the village. In contrast, the psychological health domain scored the lowest (mean = 56.1), pointing to hidden stressors such as fear of disease progression, anxiety over medical costs, and emotional burden due to reduced independence. These findings align with research Nguyen et al. (2025) who reported that QoL in hypertensive patients in Indonesian rural areas is strongly affected by emotional distress and lack of mental health services (Nguyen et al., 2025). The association between adaptation and QoL is particularly noteworthy. Patients demonstrating adaptive responses across all RAM domains were significantly more likely to report higher QoL scores (65.0%) compared to their maladaptive counterparts (25.0%). This reinforces Roy's assertion that adaptation is central to achieving holistic well-being and supports the integration of RAM into community-based nursing practices (Zhang et al., 2021).

High humidity, inadequate transit, and seasonal flooding all affect the physical well-being, access to care, and continuity of treatment of the people living in Sungai Rangas. For instance, because health centers are inaccessible during floods, some respondents stated that their medication adherence is disrupted. Furthermore, health behaviors are greatly influenced by complementary practices and traditional beliefs. In keeping with the integrative health beliefs that are common in Banjar culture, many residents continue to use acupressure and herbal remedies in addition to their prescribed medications. When properly directed, these procedures may improve adaptive capacity by conforming to the cultural norms and values of the patients. It's interesting to note that even though smoking is still common, particularly among older men, many respondents did not think it posed a health risk. This discrepancy highlights the need for culturally tailored health education, one that respects local wisdom while introducing biomedical perspectives in a respectful and relatable manner (Suroto et al., 2018).

The significance of culturally aware, context-specific interventions in the treatment of hypertension is emphasized by this study. In addition to clinical indicators, nurses working in wetland environments need to take into account the environmental and psychosocial aspects of patient care. A useful framework for evaluating patient needs holistically is the Roy Adaptation Model. The ability to recognize adaptation obstacles and support coping mechanisms in all four RAM modes should be taught to community health nurses. For example, psychological resilience may be improved by bolstering the self-concept and role function modes through peer support programs or group education sessions. Furthermore, in remote locations like Sungai Rangas, mobile clinics or floating health services during flood seasons could support treatment continuity. This study shows that rural and ecologically disadvantaged populations rely significantly on social networks and individual coping strategies, in contrast to urban-based studies where access to specialized care is more readily available (Kristinawati et al., 2024).

Furthermore, this study contributes to the small amount of research on hypertension adaptation in wetland ecologies, emphasizing the necessity of more direct future studies that address environmental health determinants. Nursing implications include the need for community nurses to apply RAM-based assessments in daily practice, deliver culturally aligned self-management education, and collaborate with local leaders to strengthen social support systems that enhance patient adaptation.

## **Conclusion**

According to the study's findings, hypertensive patients who reside in Sungai Rangas' wetland environment display a variety of adaptation patterns that have a big impact on their quality of life. The results show that people who exhibit greater adaptive responses in the four modes of Roy's Adaptation Model, physiological, self-concept, role function, and interdependence, generally have better quality of life outcomes. The modes of self-concept and interdependence among these exhibited the strongest adaptive trends, highlighting the value of emotional fortitude and social support in the management of chronic illness in rural areas. The community demonstrates strong social cohesion, which positively contributes to adaptive capacity, despite environmental challenges like seasonal flooding, limited healthcare access, and culturally embedded health practices. Low adaptation in the psychological health and role function domains, however, emphasizes the necessity of focused interventions to promote patients' mental health and functional independence.

The Roy Adaptation Model's applicability in comprehending the management of chronic diseases in a sociocultural and ecological context is confirmed by this study. Additionally, it emphasizes the importance of incorporating culturally sensitive nursing practices, such as community-based interventions and health education, into primary care services, especially in isolated and underprivileged areas like the wetland villages of Banjar. In order to improve adaptation and quality of life among hypertensive populations, it is suggested that future research include longitudinal studies to evaluate the causal relationships between adaptation and health outcomes as well as the creation of RAM-based interventions that address cultural health beliefs and environmental barriers. In addition, the study supports the use of Roy's Adaptation Model as a conceptual framework in nursing practice for chronic disease management in culturally unique environments.

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