 doi:10.20944/preprints202205.0276.v1

Review

A Critical Analysis of Using Roy's Adaptation Model in Nursing Research as an Empirical for Clinical Practice: a Systematic Review

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ABSTRACT

Background: One way to demonstrate the existence of nursing is to develop a nursing theory model through nursing research which can ultimately be implemented in nursing practice. RAM is one of the most frequently used models in guiding nursing research. Roy's Adaptation Model (RAM) is one of the most useful conceptual frameworks that guide nursing practice, direct research, and influence education. Theory-guided nursing practice is fundamental in providing the framework for developing superior and quality nursing care.
Objectives: This systematic review aims to critically analyze recent studies using RAM as a conceptual framework to identify the effectiveness of this model in guiding nursing research.
Methods: A literature search was conducted on five databases, namely SCOPUS, PubMed, ProQuest, ScienceDirect, and SAGEPub. There were no population boundaries and diagnoses involved in the study. The study is a quantitative design focused on publication between 2015-2021. The methodological quality of applying the Cochrane and JBI bias tools. The analysis uses narrative synthesis.
Results: 20 studies were found out of 1,315 studies. The research population found is very diverse. The given intervention follows the conceptual framework of RAM. RAM-based interventions effectively overcome the problems experienced by patients and reduce the perceived symptoms and improve the patient's quality of life.
Conclusion: The conceptual use of RAM theory in nursing research has been widely reported. RAM-based interventions have a significant impact and have strong evidence-based practice in improving patient health status.

Keywords: Roy's Adaptation Model; Nursing Research; Nursing Clinical Practice; Nursing Theory

1. Introduction

Currently, nursing is still considered a health profession that lacks existence, is less reliable, and is less promising in finance. Therefore, nursing must strive to show the world outside nursing that nursing can also compete and be on par with other professions. One way to demonstrate the existence of nursing is to develop a model of nursing theory through nursing research which can ultimately be implemented in nursing practice. RAM is one of the most frequently used models guiding nursing research (Abu Shosha & al Kalaldeh, 2012). Roy's Adaptation Model (RAM) is one of the most useful conceptual frameworks that

 doi:10.20944/preprints202205.0276.v1

guide nursing practice, direct research, and influence education and has been in use for approximately 40 years (Roy, 2011). Theory-guided nursing practice is fundamental in providing the framework for developing superior and quality nursing care (Callis, 2020). Applying the nursing process based on Roy's adaptation model is done by identifying deeply maladaptive behaviors and then promoting regulation and cognitive coping mechanisms that can help correct or modify maladaptive behaviors in patients with various diseases.

Roy's nursing model is known as the adaptation model, where Roy views humans as a system that can adapt (adaptive system) to various internal and external stimuli. In addition, based on RAM, the goal of nursing is to increase the level of compliance and patient life expectancy. Roy's adaptation model can evaluate patients in terms of physiology, self-concept, role function, and interdependence so that the quality of care provided is holistic care. Research related to Roy's theoretical model can be evidence-based practice (EBP) that supports nurses in nursing practice. Evidence-based practice (EBP) is one of the best ways to use up-to-date evidence to guide health care decision-making. One of the important components in realizing Evidence-based practice / EBP is the latest research on certain issues. EBP is also the best evidence for making decisions and providing scientifically effective and efficient treatment. The theoretical assumptions of Roy's adaptation model have been tested in various empirical studies. This systematic review aims to explore recent studies related to the conceptual use of the RAM model as a framework in nursing research. The hope is that the results of this review can be used as an empirical basis for nurses to provide superior and quality nursing practice.

2. Methods

Although several studies have explored RAM, the existing knowledge is heterogeneous and inconclusive due to the complex nature of adaptation within RAM. This systematic review has five stages: (1) determination of inclusion and exclusion criteria, (2) identification of relevant search and study strategies, (3) selection of eligible studies involving the use of an iterative team approach, (4) mapping the data by combining summaries, numerical and narrative synthesis, and, (5) Identification of the risk of bias and study quality. A systematic review study was conducted to review and critically analyze recent studies that use RAM as a conceptual framework to guide research to identify the effectiveness of a nursing intervention program. The Featured Reporting Items for the 2020 Systematic Review and Meta-Analysis (PRISMA) were used as a guide for reporting on this systematic review.

2.1. Inclusion and exclusion criteria

Selection and search criteria for this systematic review using PICO (population, intervention, comparison, and outcome): population (P): all studies involving pediatric to adult patients, intervention (I): use of all types of interventions based on Roy's conceptual framework, (C): outcome, (O): Roy's adaptation response: physiological response, self-concept, role function, and interdependence, (D): quantitative design (mix methods, RCT, quasi-experimental, pilot (RCT) and cohort, cross-sectional). With a publication date range between 2017-2021. The author considers five years due to the rapid acceleration of digital technology development in a short time. Therefore, recent research may be more relevant as it can provide valuable insights. The exclusion criteria were: (a) conference presentations, reviews, editorials, review articles, case reports, and case series, qualitative research, applied, applied, developmental design, or study protocols that did not explain the results, (b) publications not in English, and (c) not a study with nursing implications.

2.2. Search strategy

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A literature search was performed on five databases (SCOPUS, PubMed, ProQuest, ScienceDirect, and SagePUb). The author uses "Google scholar" to find gray literature. The author determines synonyms related to terms with keyword terms: 'nursing theory' AND Roy OR 'nursing theory' AND adaptation OR 'conceptual model' AND Roy OR 'conceptual framework' AND Roy OR 'nursing model' AND Roy OR 'nursing model' AND adaptation OR 'Roy's adaptation model' OR 'adaptation model' AND nursing OR 'Roy's theory' AND adaptation OR 'Roy model' AND nursing OR 'Roy model' AND adaptation OR 'Roy adaptation model' AND 'nursing research'. Keywords use Boolean operators (AND/OR) and asterisks to broaden and narrow searches. The search string is constructed using a combination of MeSH subject titles, thesaurus, and free text keywords.

Search strategy for SCOPUS (April 20, 2022)

Search term	Query	Item found
#1 AND #2 AND #3	**Limit to :** ('nursing AND theory' AND roy OR 'nursing AND theory' AND adaptation OR 'conceptual AND model' AND roy OR 'conceptual AND framework' AND roy OR 'nursing AND model' AND roy OR 'nursing AND model' AND adaptation OR 'roy's AND adaptation AND model' OR 'adaptation AND model' AND nursing OR 'roy's AND theory' AND adaptation OR 'roy AND model' AND nursing OR 'roy AND model' AND adaptation OR 'roy AND adaptation AND model' AND 'nursing AND research') AND (LIMIT-TO (OA , "all")) AND (LIMIT-TO (PUBYEAR , 2021) OR LIMIT-TO (PUBYEAR , 2020) OR LIMIT-TO (PUBYEAR , 2019) OR LIMIT-TO (PUBYEAR , 2018) OR LIMIT-TO (PUBYEAR , 2017)) AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (SUBAREA , "NURS")) AND (LIMIT-TO (EXACTKEYWORD , "Human")) AND (LIMIT-TO (LANGUAGE , "English")) AND (LIMIT-TO (SRCTYPE , "j"))	144
#1 AND #2 AND #3	**ALL** ('nursing AND theory' AND roy OR 'nursing AND theory' AND adaptation OR 'conceptual AND model' AND roy OR 'conceptual AND framework' AND roy OR 'nursing AND model' AND roy OR 'nursing AND model' AND adaptation OR 'roy's AND adaptation AND model' OR 'adaptation AND model' AND nursing OR 'roy's AND theory' AND adaptation OR 'roy AND model' AND nursing OR 'roy AND model' AND adaptation OR 'roy AND adaptation AND model' AND 'nursing AND research')	2.607
#3	**ALL** "('nursing AND theory' AND roy OR 'nursing AND theory' AND adaptation OR 'conceptual AND model' AND roy OR 'conceptual AND framework' AND roy OR 'nursing AND model' AND roy OR 'nursing AND model' AND adaptation OR 'roy's AND adaptation AND model' OR 'adaptation AND model' AND nursing OR 'roy's AND theory' AND adaptation OR 'roy AND model' AND nursing OR 'roy AND model' AND adaptation OR 'roy AND adaptation AND model' AND 'nursing AND research')"	12.195
#2	**TITLE-ABS-KEY** ('nursing AND theory' AND roy OR 'nursing AND theory' AND adaptation OR 'conceptual AND model' AND roy OR 'conceptual AND framework' AND roy OR 'nursing AND model' AND roy OR 'nursing AND model' AND adaptation OR 'roy's AND adaptation AND model' OR 'adaptation AND model' AND nursing OR 'roy's AND theory' AND	39

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	adaptation OR 'roy AND model' AND nursing OR 'roy AND model' AND adaptation OR 'roy AND adaptation AND model' AND 'nursing AND research')	
#1	**ALL** " Roy Adaptation model"	110.433

Search strategy for PubMed (April 20, 2022)

Search term	Query	Action	Item found
1	((((((((((((((((((((('nursing theory') AND (Roy)) OR ('nursing theory')) AND (adaptation)) OR ('conceptual model')) AND (Roy)) OR ('conceptual framework')) AND (roy)) OR ('nursing model')) AND (roy)) OR ('nursing model')) AND (adaptation)) OR ('Roy's adaptation model')) OR ('adaptation model')) AND (nursing)) OR ('Roy's theory')) AND (adaptation)) OR ('Roy model')) AND (nursing)) OR ('Roy model')) AND (adaptation)) OR ('Roy adaptation model')) AND ('nursing research')	Filters applied: Full text, research article, in the last 5 years, English.	102
2	((((((((((((((((((((('nursing theory') AND (Roy)) OR ('nursing theory')) AND (adaptation)) OR ('conceptual model')) AND (Roy)) OR ('conceptual framework')) AND (roy)) OR ('nursing model')) AND (roy)) OR ('nursing model')) AND (adaptation)) OR ('Roy's adaptation model')) OR ('adaptation model')) AND (nursing)) OR ('Roy's theory')) AND (adaptation)) OR ('Roy model')) AND (nursing)) OR ('Roy model')) AND (adaptation)) OR ('Roy adaptation model')) AND ('nursing research')	Filters applied: Full text, in the last 5 years, English	1.283

Search strategy for Sciencedirect (April 20, 2022)

Search term	Query	Action	Item found
1	('nursing theory') AND (Roy)) OR ('nursing theory')) AND (adaptation)) OR ('Roy model')) AND (nursing)) OR ('Roy model')) AND (adaptation)) AND ('nursing research')	Filters applied: Article type: research article, Years: 2017-2021 Subjek area: nursing and health profession Acces type: Open acces	122
2	('nursing theory') AND (Roy)) OR ('nursing theory')) AND (adaptation)) OR ('Roy model')) AND (nursing)) OR ('Roy model')) AND (adaptation)) AND ('nursing research')	Filters applied: Year: 2017-2021 Acces type: Open acces	643

Search strategy for ProQuest (April 20, 2022)

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Search term	Query	Action	Item found
1	'nursing theory' AND Roy OR 'nursing theory' AND adaptation OR 'conceptual model' AND Roy OR 'conceptual framework' AND Roy OR 'nursing model' AND Roy OR 'nursing model' AND adaptation OR 'Roy's adaptation model' OR 'adaptation model' AND nursing OR 'Roy's theory' AND adaptation OR 'Roy model' AND nursing OR 'Roy model' AND adaptation OR 'Roy adaptation model' AND 'nursing research'	Filters applied: fulltext, scholarly journal, article, in the last 5 years, English	637
2	'nursing theory' AND Roy OR 'nursing theory' AND adaptation OR 'conceptual model' AND Roy OR 'conceptual framework' AND Roy OR 'nursing model' AND Roy OR 'nursing model' AND adaptation OR 'Roy's adaptation model' OR 'adaptation model' AND nursing OR 'Roy's theory' AND adaptation OR 'Roy model' AND nursing OR 'Roy model' AND adaptation OR 'Roy adaptation model' AND 'nursing research'	Filters applied: Fulltext, in the last 5 years, English	65.346

Search strategy for Sagepub (April 20, 2022)

Search term	Query	Action	Item found
1	for [All 'nursing] AND [[[All theory'] AND [All roy]] OR [All 'nursing]] AND [[[All theory'] AND [All adaptation]] OR [All 'conceptual]] AND [[[All model'] AND [All roy]] OR [All 'conceptual]] AND [[[All framework'] AND [All roy]] OR [All 'nursing]] AND [[[All model'] AND [All roy]] OR [All 'nursing]] AND [[[All model'] AND [All adaptation]] OR [All 'roy's]] AND [All adaptation] AND [[All model'] OR [All 'adaptation]] AND [[[All model'] AND [All nursing]] OR [All 'roy's]] AND [[[All theory'] AND [All adaptation]] OR [All 'roy]] AND [[[All model'] AND [All nursing]] OR [All 'roy]] AND [[[All model'] AND [All adaptation]] OR [All 'roy]] AND [All adaptation] AND [All model'] AND [All 'nursing] AND [All research']	Filters applied: Research article Years: 2017-2021 Subject area: Health science Only show Open Access	298
2	for [All 'nursing] AND [[[All theory'] AND [All roy]] OR [All 'nursing]] AND [[[All theory'] AND [All adaptation]] OR [All 'conceptual]] AND [[[All model'] AND [All roy]] OR [All 'conceptual]] AND [[[All framework'] AND [All roy]] OR [All 'nursing]] AND [[[All model'] AND [All roy]] OR [All 'nursing]] AND [[[All model'] AND [All adaptation]] OR [All 'roy's]] AND [All adaptation] AND [[All model'] OR [All	Filters applied: Years: 2017-2021 Only show Open Access	1.359

 doi:10.20944/preprints202205.0276.v1

'adaptation]] AND [[[All model'] AND [All nursing]] OR [All 'roy's]] AND [[[All theory'] AND [All adaptation]] OR [All 'roy]] AND [[[All model'] AND [All nursing]] OR [All 'roy]] AND [[[All model'] AND [All adaptation]] OR [All 'roy]] AND [All adaptation] AND [All model'] AND [All 'nursing] AND [All research']

2.3. Selection of study

A total of 1,315 studies included 1,303 studies from major database journals and 12 studies from the gray literature "Google scholar". All studies were entered into Mendeley or Zotero (database reference managers) and exported in CSV format for filtering in Microsoft Excel sheets. The study screening process was conducted in Excel format, and reporting follows the Preferred Reporting Items for Systematic Review and Meta-Analyses flowchart 2020.

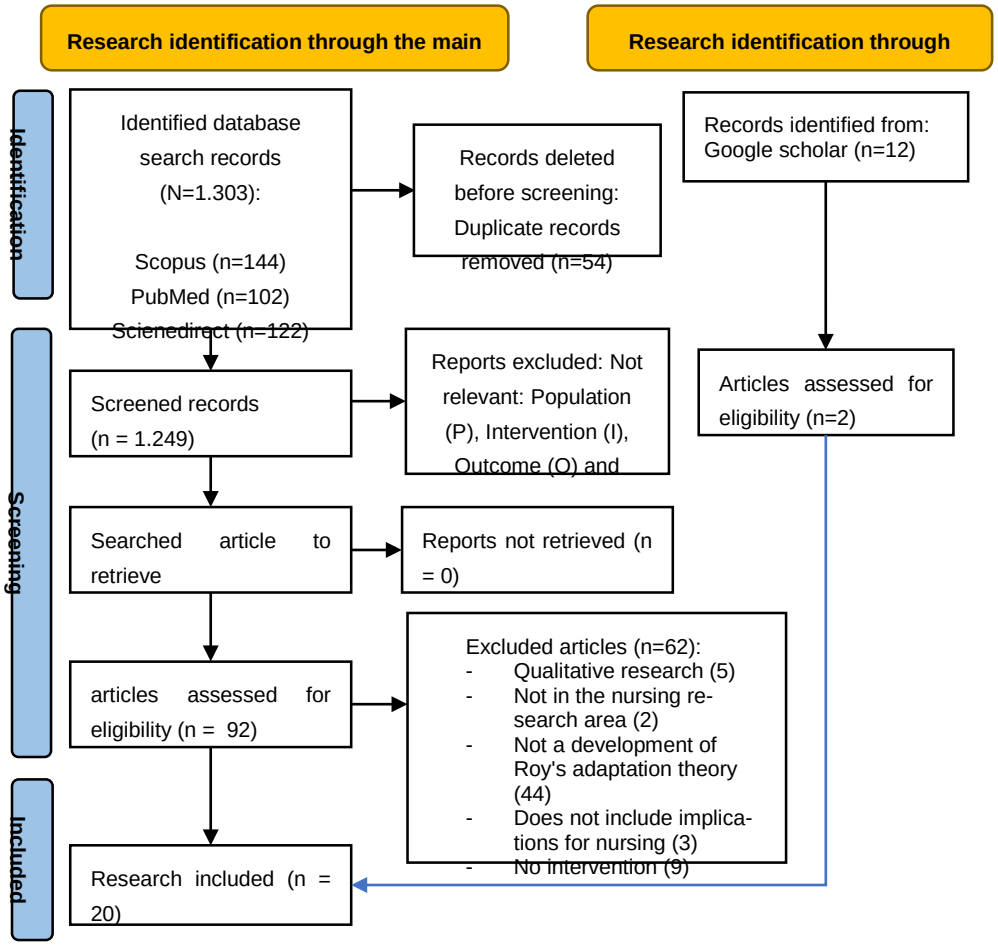

Figure 1. Flowchart used in selecting studies using PRISMA (Preferred Reporting Items for Systematic Review and Meta-Analyses)

 doi:10.20944/preprints202205.0276.v1

The study selection process from 1,315 studies (1,303 from the electronic journal database and 12 from the "google scholar" gray literature) was initiated by removing duplicates. All authors independently screened potentially relevant studies by title and abstract. We found 20 studies that were relevant and read in full text independently by the authors. Then, the authors discussed and made a consensus if there were disagreements and reviewed the data together. Finally, there were 20 studies included in this systematic review (Figure 1).

2.4. Data extraction, analysis, and synthesis

We designed a data extraction table based on the PICO framework as a guide. The data extraction process uses Microsoft Excel sheets. Both authors read all articles and data extracted independently, and any discrepancies were discussed and resolved consensually. If differences cannot be resolved, a third opinion will be sought, but it will prove unnecessary. Because there was clear heterogeneity among studies within the study population, the form of intervention, and study design, meta-analysis was impossible. So we only conducted a narrative review of the findings. Narrative synthesis is carried out to interpret the evidence findings, including the general characteristics surrounding the elements of the PICO question framework. The authors synthesized by extracting data using Microsoft Excel sheets and testing them on the two included studies. We create metrics for each outcome, identify and summarize the synthesis and report the results of the included studies. We discussed this during the synthesis process and are open to input.

2.5. Risk of bias and study quality

The authors identified the quality of the studies taking into account the risk of bias. This assessment aims to assess the methodological quality and determine how a study has overcome possible biases in its design, conduct, and analysis. To identify the risk of bias, this systematic review uses three bias evaluation tools: (ROBIN-I) tool for non-randomized studies and quasi-experimental studies using JBI critical appraisal checklist for quasi-experimental studies.

The authors used the Study (ROBIN-I) tool to evaluate the risk of bias in non-randomized studies. The type of non-randomized study that can be evaluated using this tool is a quantitative study that estimates the effectiveness (harm or benefit) of an intervention, which does not use randomization to allocate units (individuals or groups of individuals) into the comparison group. ROBIN identified research bias across seven domains.

The authors evaluated the risk of bias for a randomized controlled trial (RCT) using an RoB of 2.0. RoB 2.0 assesses five types of the potential risk of bias: (1) bias arising from the randomization process (such as lack of concealment of the allocation order, lack of detail about how randomization was performed, or baseline imbalances between groups); (2) bias due to deviations from the intended intervention either related to assignment to the intended intervention (such as deviation from the intended intervention or switching participants between groups) or the effects of initiating and following the intervention (such as lack of blinding in the study or withdrawal of participants from the study).); (3) bias due to missing outcome data (such as lack of intention-to-treat analysis or missing data pooling where there was a significant dropout, or missing data were not evenly distributed between groups); (4) bias in outcome measures (such as raters of outcomes that could influence outcome measures or knowledge of group allocations that might influence outcome measures); and (5) bias in the selection of reported outcomes (such as incomplete reporting of all measures involved in the study or inadequate statistical analysis, here of time-by-group interactions across studies).

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As a tool to evaluate the quality of studies for quasi-experimental research, researchers used the Checklist for Quasi-Experimental Studies from the Joanna Briggs Institute (JBI). The JBI assessment tool is a checklist questionnaire with a list of required items, things to do, and points to consider. Each research design has different questions. Researchers must assess the articles that have been selected. The scoring results come from low risk, medium risk, high risk or unclear risk.

a. *Non-randomized study*

No	Study	D1	D2	D3	D4	D5	D6	D7	Over-all
1	(Culha et al., 2020)	!	!	+	!	+	!	+	!

Domain
D1: Bias due to confounding, D2: Bias in a selection of participants in the study, D3: Bias in the classification of interventions, D4: Bias due to deviations from intended interventions, D5: Bias due to missing data, D6: Bias in the measurement of outcomes, D7: Bias in the selection of the reported result.
Judgment
Serious/Moderate/Low

b. *Randomized controlled trial* (RCT)

No	Study	D1	D2	D3	D4	D5	Overall
1	(Mansouri et al., 2019)	+	+	+	+	+	+
2	(Hamzehpour et al., 2018)	!	+	+	+	+	+
3	(Hajalimohammadi et al., 2020)	!	!	+	!	!	!
4	(Abdolahi et al., 2020)	!	!	+	!	!	!
5	(Otaghi et al., 2018)	!	-	-	-	!	-
6	(Kavuran & Yurttaş, 2018)	+	+	+	+	!	+
7	(Maleki et al., 2018)	!	!	+	-	!	!
8	(Lok et al., 2020)	+	!	+	-	!	!
9	(Kavradim & Özer, 2020)	+	!	+	!	!	!

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10	(Nobahar et al., 2020)	+	+	+	!	!	!
11	(Alimohammadi et al., 2018)	!	!	+	-	!	!

Domain

(1) bias arising from the randomization process; (2) bias due to deviations from intended interventions; (3) bias due to missing outcome data; (4) bias in the measurement of the outcome; (5) bias in the selection of the reported result.

Judgment

Low / High / Some concerns

c. *Checklist for Quasi-Experimental Studies* from *Joanna Briggs Institute* (JBI)

No	Study	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Overall
1	(Baksi & Dicle, 2017)	Y	Y	Y	Y	N	Y	Y	Y	N	7/9 (78%)
2	(Guo et al., 2020)	Y	Y	Y	Y	Y	N	Y	Y	Y	8/9 (89%)
3	(Wang et al., 2020)	Y	Y	Y	Y	N	Y	Y	Y	N	7/9 (78%)
4	(Amanak et al., 2019)	Y	Y	Y	Y	N	Y	Y	Y	Y	8/9 (89%)
5	(Hatami & Hojjati, 2019)	Y	Y	Y	Y	Y	N	Y	Y	Y	8/9 (89%)
6	(K. K. Dharma et al., 2018)	Y	Y	Y	Y	Y	Y	Y	Y	N	8/9 (89%)
7	(Alidoost et al., 2021)	Y	Y	Y	Y	N	Y	Y	Y	N	8/9 (89%)
8	(Elmoneim et al., 2017)	Y	Y	Y	Y	N	Y	Y	Y	N	8/9 (89%)

RESULTS

From the results of searching several scientifically based data, obtained 20 studies that describe the use of RAM as a conceptual framework in guiding nursing research to identify the effectiveness of a nursing intervention program. The description of the selected studies according to the inclusion and exclusion criteria of this systematic review is as follows (Table 1):

 doi:10.20944/preprints202205.0276.v1

Table 1. Description of studies according to the systematic review criteria

No	Author	Design	Population	Number of subject	Intervention	Length of intervention	Result
1	(Mansouri et al., 2019)	Randomized control trial	Patients with heart failure	76	oral and written educational programs/training based on Roy's adaptation model	4 weeks. 1 session/weeks.	Psychological factors, role function, independent-interdependent dimensions and self-concept experienced a significant increase
2	(Baksi & Dicle, 2017)	Quasi exsperment	Patients with primary brain tumor (PBT)	95 Patients, (45 interventions, 50 controls)	Education with a special booklet for PBT (roy's adaptation approach)	Education lasts for 30-120 minutes in bed, then will be followed up by phone for 3 times	RAM is effective on the dimensions of symptoms and disorders as well as social support in dealing with stress
3	(Hamzehpour et al., 2018)	Triple-blind randomised control Trial	Patients admitted to the ICU with severe delirium	100 patients	RAM with face to face education and pamphlet training.	The educational activity lasts for 2 hours in 4 sessions	There was a significant difference between the control and intervention groups on day 4, there was a decrease in delirium in the intervention group with RAM
4	(Abdolahi et al., 2020)	Experimental study	Patients with heart failure	60 patients	Intervention in the form of a care plan with a face to face training program based on RAM	The activity lasted for 6 sessions for 1 month.	RAM implementation can reduce the patient's level of fatigue and increase the ability to carry out daily activities.
5	(Culha et al., 2020)	Non-randomized intervention study	Patients with ovarian, cervical, and endometrial cancer, stage 1, 2 and 3.	72 patients, 36 controls and interventions	Training program with booklets.	The intervention lasted for 1 year.	Discharge training based on RAM can improve the quality of life and adaptation of patient coping.

 doi:10.20944/preprints202205.0276.v1

6	(Otaghi et al., 2018)	Semi-experimental study	Female patient with breast cancer	80 patients	Care plan/training based on Roy's adaptation model (RAM)	10 sessions in 1 month	Care plans based on RAM can improve the patient's spiritual health and adaptive behavior to the stresses and problems of life.
7	(Hajalimohammadi et al., 2020)	Clinical trial study	Elderly patients who have cancer and undergoing chemotherapy	130 people (65 controls and interventions)	Training	4 month	The training program using the RAM method can overcome the fatigue experienced by elderly patients when undergoing chemotherapy.
8	(Kavuran & Yurttaş, 2018)	Clinical dan eksperimental study	Type 2 diabetic patient	130 patients	Education or training face-to-face with the media booklet with the theme "adaptation in diabetics".	4 month	Education with RAM has a positive impact on patients' diabetic care.
9	(Guo et al., 2020)	Quasi eksperiment	Patients with Parkinson's disease	90 patients	Interventions given based on RAM are psychological interventions (stimulation) such as suggesting to reduce caffeine for 4-6 hours before going to bed and taking a warm bath. as well as role intervention, dependence and self-concept intervention.	1 month	Treatment with RAM can reduce sleep disturbances, increase iron absorption and quality of life.
10	(Wang et al., 2020)	Quasi-experiment	Patients with heart failure	112 patients	RAM-based care plan	20 months	Guided interventions with RAM may improve the adaptive behavior of heart failure patients.

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11	(Maleki et al., 2018)	Clinical trial	Patients with cerebrovascular accident (CVA)	50 patients	The intervention provided was based on the health team's training protocol, such as nurses, doctors, psychologists, and nutritionists.	8 weeks for 4 sessions	Treatment of CVA patients with a comprehensive RAM approach can improve the psychosocial dimensions of CVA patients
12	(Amanak et al., 2019)	Quasi-experiment, case-control	Gestational hypertension	132 patients	Prenatal education with RAM approach	5 Sessions, 20-40 minutes/session	In the intervention group, 64.7% of pregnant women did not experience preeclampsia, while the control group was 23.4%.
13	(Lok et al., 2020)	Randomized control trial	Alzheimer's patient	60 patients	RAM-based CST	7 Weeks	The level of cognitive function of the intervention group is higher than the control group
14	(Kavradim & Özer, 2020)	Randomized control trial	Patients undergoing treatment for a myocardial infarction	33 patients	Education and follow up by phone based on RAM	12 weeks	There is an increase in self-efficacy, quality of life, and coping adaptation in the intervention group with RAM
15	(Hatami & Hojjati, 2019)	Quasi-experiment	Mother with a child undergoing chemotherapy	36 patients	A training program based on Roy's adaptation	4 weeks	RAM can significantly reduce the burden of treatment in the chemotherapy process with non-invasive procedures
16	(K. K. Dharma et al., 2018)	Quasi-experiment	Family caregivers for stroke patients	80 patients and families	Family empowerment with RAM based program (CEP-BAM)	3 weeks	RAM-based programs (CEP-BAM) can improve the role of families and the quality of life of stroke patients
17	(Monir Nobahar et al., 2020)	Randomized control trial	Patients undergoing hemodialysis	60 patients	Educational program with RAM (Expression, question and answer,	2 weeks	Educational programs with RAM can reduce somatic symptoms, levels of

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					discussion, group counseling sessions)		depression, anxiety and insomnia in HD patients
18	(Alidoost et al., 2021)	Quasi-experiment	elderly patient	60 patients	Care plan based on RAM	1,5 months	A nursing care plan based on RAM can reduce the level of depression in the elderly
19	(Elmoneim et al., 2017)	Quasi-experiment	Mothers who underwent hysterectomy	60 patients	Educational supportive program based on RAM	4 weeks	Educational programs based on RAM have a positive impact on social functioning and spouse support
20	(Alimohammadi et al., 2018)	Semi experimental	Adult asthma patient	64 patients	Adaptation training based on RAM	8 months	Adaptation training based on RAM can reduce mal-adaptation behavior in asthmatic patients

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The author obtained 1,315 articles through all predefined databases. Only 21 studies met the inclusion criteria in this systematic review. Table 1 above shows that the population age and diagnoses in the study varied widely. However, the type of intervention provided was not much different. All of the above studies use RAM as a conceptual framework for conducting research. The table shows that all RAM-based research was conducted in clinical settings, namely in hospitals and health centers, with an age range ranging from children, adult patients, and the elderly. Based on the 21 literature above, it can be seen that the conceptual use of the Roy model (RAM) adaptation theory as a guide in nursing research has a positive impact on improving the quality of care and patient health. The intervention provided was education, training, and counseling based on the conceptual RAM model. The education on various acute and chronic diseases with mild, moderate, or severe severity requires long-term and short-term care. These diseases include patients with COPD, heart failure, chronic kidney failure, Parkinson's disease, cancer, delirium, brain stroke, CVA, and asthma. The results obtained from the intervention in the form of education with the RAM approach or Roy's adaptation model have proven to be effective in overcoming the problems experienced by patients, reducing the symptoms they feel, and improving patients' quality of life.

Component	Characteristic	(n=21)	Percentage (%)
Age (Year)	Adult	10	50%
	Elderly	3	14%
	Tidak jelas	7	33%
Setting	Clinical	21	100%
	Non-clinical	-	-
Diagnosis	Heart disease	3	15%
	Brain tumor	1	5%
	CKD	1	5%
	Cancer	4	20%
	DM	1	5%
	Parkinson	1	5%
	Stroke	2	5%
	CVA	1	5%
	Hypertention	1	5%
	Alzheimer	1	5%
	post partum depression	1	5%
	Hysterectomy	1	5%
	Asthma	1	5%
	Depression	1	5%
Type of intervention	Education/ counseling/training	16	80%
	Care plan	3	15%
	Empowerment program	1	5%

Tabel 1 Deskripsi persentase (%) studi

Based on table 2, the study population was primarily adults (44%), and only 1 article was in the pediatric population (4%). All studies were conducted in clinical settings (100%) either in hospitals, clinics, or primary health care. The diagnoses in each population in the study varied widely. The most frequent diagnoses were heart disease and cancer

(14%). The type of intervention mainly given was in the form of education/training (87%).

3. Discussion

This review aims to review and critically analyze recent studies that use RAM as a conceptual framework to guide nursing research. The 20 articles above illustrate that researchers developed the concept of the main RAM framework for the intervention model. The previously illustrated study explicitly demonstrates the importance of using

RAM in nursing research. Given its simplicity and easy application, this model can be used to improve the outcome of an intervention (Mohammadpour et al., 2016). RAM provides a practical framework for assessing individual adaptation regardless of age or condition. Every individual who experiences chronic diseases such as kidney failure, heart failure, COPD, or cancer will experience a crisis such as loss of activity or aging, which makes the patient's ability to adapt decreases, cognitive and sensory problems, decreased level of independence which has an impact on the perception of health to be decreased and trigger maladaptive responses. However, the basic assumption of RAM theory is that every individual has the potential to overcome stressful situations and try to carry out the adaptation process (Russo, 2019).

The adaptation process focuses only's adaptation through several stages: stimulus (input) that contributes to behavior, develops suitable coping mechanisms, and produces output in the form of an adaptive or maladaptive response (Wantonoro, 2020). According to RAM, humans are adaptive systems that can adapt to complex problems throughout their lives. An individual can adapt to different degrees, and the degree of this adaptation affects the human ability to respond positively to a situation. An individual can also control the stimuli in his life as a coping strategy. The use of coping strategies produces an individual adaptive response (K. K. Dharma & Rahayu, 2022). RAM also explains that nurses focus on human and environmental interactions that promote maximum human development and well-being. Therefore, nurses evaluate the adaptation status of humans and plan interventions that are directed at converting negative stimuli into positive responses (Amanak et al., 2019).

This systematic review shows that 80% of studies develop interventions in the form of RAM-based education and counseling. Education with RAM is a social support program that can assist patients in carrying out the adaptation process effectively and efficiently (Adib-Hajbaghery et al., 2021). Education guided by Roy's adaptation model improves most of the coping strategies in veterans with lower extremity amputations (Farsi & Azarmi, 2016), improves hypertension management (Kilic et al., 2018), improves adaptation response and quality of life in heart failure patients (Mansouri et al., 2019), the adaptation of type 2 Diabetes Mellitus patients (Kavuran & Yurttaş, 2018), managing stress symptoms and improving coping strategies of brain tumor patients (Baksi & Dicle, 2017). Several studies explain in detail how the use of RAM in their research. Amanak, Sevil, and Karacam (2019) analyzed the effectiveness of RAM-based prenatal education in mothers with gestational hypertension. This study reported that the incidence of mild and severe preeclampsia in the group given education was lower than in the group that did not receive an education. The education provided using an educational booklet includes four modes of adaptation based on RAM theory, namely physiological, self-concept, role function, and interdependence. This study determined non-adaptive behavior based on RAM through semi-structured interviews. Then after the problem was identified, the researcher conducted coaching through educational booklets and assessed the outcome after being given education. These findings reveal that RAM-based educational interventions effectively control hypertension in pregnant women (Amanak et al., 2019).

Mohammadpour et al. (2016) developed a RAM-based intervention program to eliminate or modify focal stimuli and minimize the effects of contextual and residual stimuli by increasing respondents' adaptive capacity. The program consists of educational and counseling services provided by nurses and mental health counselors. The counseling sessions include effective communication strategies with husbands and other people, happy life skills, stress and anger management skills, and encouragement for pregnant women to express their feelings about pregnancy and childbirth. While the educational content consists of material about common complaints related to pregnancy and how to overcome them, the role of stress in pregnancy and its effects on maternal and infant health, physical health during pregnancy, physical exercise and fitness during pregnancy, effective interpersonal communication, and marital relationship skills. The same study was also conducted by (Elmoneim et al., 2017) on hysterectomy patients. The intervention program was developed using RAM to remove or modify focal stimuli and minimize the effects of contextual and residual stimuli by increasing women's adaptive capacity. Learning facilities consist of training sessions and pamphlets. The women learned skills such as relaxation activities, including walking, pelvic muscle strengthening exercises, lubricating gel, and effective communication before sexual intercourse, which showed that the intervention had a positive effect on sexual function after hysterectomy.

Based on Roy's adaptation theory (RAM), the success of education is supported by the role dimensions, social support, and self-concept. Often the severity of the disease is caused by ineffective physiological responses. In the concept of RAM, the role is defined as a person's expectations of others, so that if someone has problems in carrying out the role, it will certainly affect his ability to improve health. In addition, as social beings, various forms of social support have a high contribution to the management of acute/chronic diseases. Social support can increase the patient's self-

 doi:10.20944/preprints202205.0276.v1

confidence/self-efficacy, which impacts the patient's ability to perform self-care (Shariatpanahi et al., 2020). At the same time, the self-concept is an adaptive response reflected in a person's behavior.

Moreover, the physiological mode is a person's way of responding physically and spiritually to the environment. These various factors are related to each other. Good social support can stimulate the emergence of good self-concept and increase adaptive physiological responses, both physical and spiritual qualities (Russo, 2019).

In conducting education based on RAM, the focus of training or training is adapting self-concept with several techniques such as stress management, relaxation techniques, and increasing psychological support (Rezaei et al., 2021). In addition, group education can improve patient communication skills and increase adaptive attitudes (Adib-Hajbaghery et al., 2021). The central theme of the education or training provided is an adaptation to treatment therapy that is carried out and education on the lifestyle that should be carried out to improve healing and the quality of life of patients (Kilic et al., 2018). Quality of life is an individual's standard or perception of their position in life, which is greatly influenced or influenced by a person's physical health, social relationships, and the level of independence of each individual (Almasloukh & Stewart Fahs, 2021).

A systematic review also reported that RAM is also used to develop patient care plans. In developing a treatment plan based on RAM, researchers initially conducted a RAM-based assessment to identify focal, contextual, and residual stimuli and determine participants' maladaptive behaviors in physiological, self-concept, role function, and interdependence modes. Then, a treatment plan was designed and implemented for each participant based on the identified maladaptive behaviors. Researchers improved each participant's maladaptive behavior in 4 modes of adaptation through manipulation of their focal, contextual, and residual stimuli (Alidoost et al., 2021; Nobahar et al., 2020). For example, participants with muscle weakness (physiological problems) caused by limited mobility (stimulus focus) were encouraged to perform physical exercises such as walking. In addition, participants with constipation (physiological problems) caused by limited fluid intake and high-fiber foods (focal stimulation) and decreased physical activity (contextual stimuli) were given a high-fiber diet (consisting of fruits and vegetables) and sufficient fluids and asked to do physical activity. Participants with maladaptive behavior in role functions and modes of interdependence are also provided with counseling services by psychology (Alidoost et al., 2021). The findings suggest a positive effect of using RAM-based care plans in hemodialysis patients (Nobahar et al., 2020) and depression in nursing home residents (Alidoost et al., 2021).

In addition to developing interventions in the form of education, counseling, and treatment plans, this systematic review also reports on the use of Roy's adaptation model in developing other intervention programs, which has proven to be very effective in increasing the effectiveness of an intervention program. Research conducted by Dharma and Halina-Rahayu (2022) created an intervention program in the form of a RAM-based Caregiver empowerment program. This program aims to empower families in improving patients' quality of life and reduce the burden on families to train post-stroke patient adaptation. This study found ten themes of effective adaptive response after stroke, consisting of 3 themes of stimulus or stressors felt by patients and families, 3 themes of adaptive coping strategies used to control problems, and four themes related to effective adaptive behavior. Then, the researcher integrated this qualitative theme with RAM to form a RAM-based Caregiver empowerment program intervention model. Families are trained to facilitate and assist stroke patients in adapting to various disabilities to achieve optimal quality of life after stroke (K. K. Dharma & Rahayu, 2022).

4. Conclusion

The conceptual use of RAM theory in nursing research has been widely reported. The use of RAM in nursing research can develop interventions in the form of education, counseling, training programs, and empowering a community. Apart from being used to develop an intervention, RAM is also used as a basis for developing a treatment plan that aims to improve the quality of care. A RAM-based intervention or program and treatment plan effectively improves the adaptive response and quality of life of patients in various settings and conditions.

5. Limitations

The development of the use of RAM in the child population is still minimal. Further studies are needed using populations of children with various settings and conditions.

6. Implication of Findings On Nursing Practice

The results of this systematic review can form the basis for evidence-based nursing practice to provide quality nursing care. The conceptual use of the RAM model is reliable and can assist nurses in detecting or assessing the patient's maladaptive stimuli and behaviors. Then, the identification results become the basis for nurses in determining treatment plans and are implemented based on the identified maladaptive behaviors.

Conflict of Interest: The author(s) declares that there is no conflict of interest.

Acknowledgement: The authors thank the Faculty of Nursing Universitas Airlangga for the facilities in this study.

References

Abdolahi, M., Doustmohamadi, M. M., & Sheikhbardsiri, H. (2020). The Effect of an Educational Plan Based on the Roy Adaptation Model for Fatigue and Activities of Daily Living of Patients with Heart Failure Disease. *Ethiopian Journal of Health Sciences*, *30*(4), 559–566. https://doi.org/10.4314/ejhs.v30i4.11

Abu Shosha, G., & al Kalaldeh, M. (2012). A critical analysis of using roy's adaptation model in nursing research. *International Journal of Academic Research*, *4*(4), 26–31. https://doi.org/10.7813/2075-4124.2012/4-4/b.3

Adib-Hajbaghery, M., Maghsoud, F., & Batooli, Z. (2021). Evaluating Effect of Social Support Programs Based on the Roy's Adaptation Model on Patients with Breast Cancer: A Systematic Review. *Journal of Research Development in Nursing and Midwifery*. https://doi.org/10.29252/jgbfnm.18.2.14

Alidoost, N., Naseri, O., Jahanban, A., Maslakpak, M., Maghsoudi, B., & Maghsoodi, E. (2021). The effects of a care plan based on the roy adaptation model on depression among nursing home residents. *Nursing and Midwifery Studies*, *10*(2), 87. https://doi.org/10.4103/nms.nms_51_19

Alimohammadi, N., Maleki, B., Abbasi, S., Shakerian, B., & Hemati, Z. (2018). The Effect of Adaptation Training on Controlling Maladaptation Behaviors in Adolescents with Asthma Based on Roy Adaptation Model. *Tanaffos*, *17*(2), 103–109.

Almasloukh, K. B., & Stewart Fahs, P. (2021). Quality of Life Through the Prism of the Roy Adaptation Model. *Nursing Science Quarterly*, *34*(1), 67–73. https://doi.org/10.1177/0894318420965221

Amanak, K., Sevil, Ü., & Karacam, Z. (2019). The impact of prenatal education based on the roy adaptation model on gestational hypertension, adaptation to pregnancy and pregnancy outcomes. *Journal of the Pakistan Medical Association*, *69*(1), 11–17.

Baksi, A., & Dicle, A. (2017). Examining the Effect of Education Given by Roy Adaptation Model in Patiıents With Primary Brain Tumors on Symptoms and Coping with Stress. *International Journal of Caring Sciences*, *10*(2), 842–858. www.internationaljournalofcaringsciences.org

Callis, A. M. (2020). Application of the Roy Adaptation Theory to a care program for nurses. *Applied Nursing Research*, *56*, 151340. https://doi.org/10.1016/j.apnr.2020.151340

Culha, I., Gursoy, E., & Bulut, H. (2020). Investigating the Effect of a Structured Discharge Training Program on Patient Outcomes Following Gynecologic Oncology Surgery. *Clinical Nursing Research*, *29*(8), 616–626. https://doi.org/10.1177/1054773820917299

Dharma, K. K., Damhudi, D., Yardes, N., & Haeriyanto, S. (2018). Increase in the functional capacity and quality of life among stroke patients by family caregiver empowerment program based on adaptation model. *International Journal of Nursing Sciences*, *5*(4), 357–364. https://doi.org/10.1016/j.ijnss.2018.09.002

Dharma, K. K., & Rahayu, H. (2022). The effective post-stroke adaptation behavior model requires a family support system. *Enfermería Clínica*, *32*(2), 123–130. https://doi.org/10.1016/j.enfcli.2020.11.001

Elmoneim, E. F. A., Ghonemy, G. E., & Hassan, N. I. (2017). Effect of Roy Adaptation Model on Sexual Function and Spousal Support among Women after Total Hysterectomy. *IOSR Journal of Nursing and Health Science*, *06*(02), 130–140. https://doi.org/10.9790/1959-060205130140

Farsi, Z., & Azarmi, S. (2016). Effect of roy's adaptation model-guided education on coping strategies of the veterans with lower extremities amputation: A double- blind randomized controlled clinical trial. *International Journal of Community Based Nursing and Midwifery*, *4*(2), 127–136.

Guo, Y., Gao, X., & Ji, S. (2020). Improvements of sleep quality and qol by roy adaptation model in nursing of patients with parkinson's disease. *International Journal of Clinical and Experimental Medicine*, *13*(2), 1033–1040.

Hajalimohammadi, M., Esmaeili, R., Zandi, M., & Zadeh, B. P. (2020). Evaluation of the Effect of Caring Program Based on Roy Adaptation Model in Physiology and Self-Concept Dimensions on Fatigue of Elderly Cancer Patients Undergoing Chemotherapy. *Medico-Legal Update*, *20*(2), 262–267. https://doi.org/10.37506/mlu.v20i2.1113

Hamzehpour, H., Valiee, S., Majedi, M. A., Roshani, D., & Seidi, J. (2018). The Effect of Care Plan Based on Roy Adaptation Model on the Incidence and Severity of Delirium in Intensive Care Unit Patients: A Randomised Controlled Trial. *Journal of Clinical and Diagnostic Research*, *12*(11). https://doi.org/10.7860/JCDR/2018/36366.12256

Hatami, F., & Hojjati, H. (2019). Effect of Roy's Adaptation Model on the Care Burden of Mothers of Children Under Chemotherapy in Gorgan in 2018: A Quasi-Experimental Study. *Medical - Surgical Nursing Journal*. https://doi.org/10.5812/msnj.90489

Kavradim, S. T., & Özer, Z. C. (2020). The effect of education and telephone follow-up intervention based on the Roy Adaptation Model after myocardial infarction: randomised controlled trial. *Scandinavian Journal of Caring Sciences*, *34*(1), 247–260. https://doi.org/10.1111/scs.12793

Kavuran, E., & Yurttaş, A. (2018). Effects of Education Based on Roy Adaptation Model on Diabetes Care Profile of Patients with Type 2 Diabetes Mellitus. *Iranian Red Crescent Medical Journal*, *20*(4). https://doi.org/10.5812/ircmj.64635

Kilic, D., Turkoglu, N., Yalcinoz Baysal, H., Adibelli, D., Bilgin, S., & Akyil, R. C. (2018). The Effect of Education Provided Using the Roy's Adaptation Model on Hypertension Management. *International Journal of Caring Sciences*, *11*(1), 1–333.

Lok, N., Buldukoglu, K., & Barcin, E. (2020). Effects of the cognitive stimulation therapy based on Roy's adaptation model on Alzheimer's patients' cognitive functions, coping-adaptation skills, and quality of life: A randomized controlled trial. *Perspectives in Psychiatric Care*, *56*(3), ppc.12472. https://doi.org/10.1111/ppc.12472

Maleki, B., Mohammadi, N. A., & Shahriari, M. (2018). The Application of Roy's Adaptation Model to Promote Psychosocial Status of CVA Patients. *Journal of Addiction Research*, *2*(2). https://doi.org/10.33140/JAR/02/02/00006

Mansouri, A., Baraz, S., Elahi, N., Malehi, A. S., & Saberipour, B. (2019). The effect of an educational program based on Roy's adaptation model on the quality of life of patients suffering from heart failure: A clinical trial study. *Japan Journal of Nursing Science*, *16*(4), 459–467. https://doi.org/10.1111/jjns.12255

Mohammadpour, A., Najafi, S., Tavakkolizadeh, J., & Mohammadzadeh, F. (2016). The effects of the roy's adaptation model on primigravida women's self-concept: A randomized controlled trial. *Asian Journal of Pharmaceutical Research and Health Care*, *8*(December), 17–23. https://doi.org/10.18311/ajprhc/2016/7717

Monir Nobahar, Mohadese Saffari, Hassan Babamohamadi, Nemat Sotodehasl, & Majid MirmohammadkhaniWodak. (2020). The effect of a care plan based on the Roy adaptation model on general health in hemodialysis patients; a randomized controlled clinical trial. *Journal of Renal Injury Prevention*, *x*(x), 1–11. https://doi.org/10.34172/jrip.2020.xx

Nobahar, M., Saffari, M., Babamohamadi, H., Sotodehasl, N., & Mirmohammadkhani, M. (2020). The effect of a care plan based on the Roy adaptation model on general health in hemodialysis patients; a randomized controlled clinical trial. *Journal of Renal Injury Prevention*, *9*(2), e11–e11. https://doi.org/10.34172/jrip.2020.11

Otaghi, M., Nazarpour, B., Taghinegad, H., & Khorshidi, A. (2018). The effect of care plan based on Roy Adaptation Model on the spiritual well-being of women with breast cancer. *Medical Science*, *22*(92), 418–422.

Rezaei, A., Shariati, A., Molavynejad, S., & Ghanbari Chah Anjiri, S. (2021). The Effect of a Training Program Based on Roy's Adaptation Model on the Adaptation of Patients Undergoing Coronary Artery Bypass Graft in Intensive Care Units. *Jundishapur Journal of Chronic Disease Care*, *In Press*(In Press), 1–7. https://doi.org/10.5812/jjcdc.118237

Roy, C. (2011). Research based on the roy adaptation model: Last 25 years. *Nursing Science Quarterly*, *24*(4), 312–320. https://doi.org/10.1177/0894318411419218

Russo, S. A. (2019). *Development and Psychometric Analysis of the Roy Adaptation Modes Scale (RAMS) to Measure Coping and Adaptation*. The CityUniversityof New York.

Shariatpanahi, S., Farahani, M. A., Rafii, F., Rassouli, M., & Tehrani, F. J. (2020). Application of roy adaptation model on adherence to treatment in patients with heart failure. *Revista Latinoamericana de Hipertension*, *15*(2), 128–137.

Wang, X., Tang, L., Howell, D., Zhang, Q., Qiu, R., Zhang, H., & Ye, Z. (2020). Theory-guided interventions for Chinese patients to adapt to heart failure: A quasi-experimental study. *International Journal of Nursing Sciences*, *7*(4), 391–400. https://doi.org/10.1016/j.ijnss.2020.09.004

Wantonoro. (2020). Health Promotion and Exercise Planning Older Person with Post-Stroke; Roy's Adaptation Theory Approach: A Protocol. *International Journal of Caring Sciences*, *13*(2), 1509–1516.

 doi:10.20944/preprints202205.0276.v1