

Impact of applying the theory of human becoming and self-care deficit theory of nursing on insomnia in after stroke urinary incontinence patients



Review

Helty Helty^{a,*}, Ratna Sitorus^b, Haryanto Haryanto^c

^aMedical Surgical Nursing Department, Faculty of Health Science, Universitas Mandala Waluya, Kendari, Sulawesi Tenggara 93121, Indonesia

^bMedical Surgical Nursing Department, Nursing Faculty, Universitas Indonesia, Depok, Jawa Barat 16424, Indonesia

^cMedical Surgical Nursing and Wound Management Department, Nursing Faculty, West Kalimantan Muhammadiyah Institute of Technology and Health, Kalimantan Barat 78122, Indonesia

Received: 9 January 2024; Accepted: 27 March 2024; Published: 20 September 2024

Abstract: Objective: To determine the impact of applying the theory of human becoming and self-care deficit theory of nursing in overcoming insomnia in patients of urinary incontinence (UI) after stroke. Insomnia is a sleep disorder experienced by UI patients after stroke which can exacerbate problems related to brain damage and can complicate the recovery process.

Methods: This study was a quasi-experimental conducted in 4 hospitals. Fifty-six patients were selected by convenience sampling and divided into 2 groups (the intervention and control group). Participants in the intervention group received “applying the theory of Human becoming and self-care deficit theory of nursing,” starting when the patient is about to go home from the hospital and continuing at the house. Measurement of insomnia is done using the Pittsburgh Sleep Quality Index (PSQI).

Results: The mean insomnia scores of participants from both groups increased in the first and third measurements. The second and third insomnia measurements found a significant difference ($P < 0.001$). This intervention decreased the average score of insomnia by 4.11 times in the second measurement and 5.82 times in the third measurement. The most important item that decreased in the third measurement of insomnia was sleep efficiency.

Conclusions: Applying the theory of human becoming and self-care deficit theory of nursing in this study significantly decreased the insomnia score of post-stroke UI patients. It can be used as a guide for nurses, patients, and families in managing insomnia. In addition, the application of nursing theory in nursing practice can systematize nursing care plans and organize the knowledge of professionals into a conceptual framework, as well as provide effective guidance for nurses on what to do.

Keywords: human becoming theory • insomnia • self-care deficit theory • stroke • urinary incontinence

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1. Introduction

One of the problems that arise in post-stroke urinary incontinence (UI) is insomnia. Insomnia is a sleep disorder that occurs in around 23% due to UI in post-stroke patients.¹ This disorder is 3 times more than 10% of the general population who experience insomnia disorders.²

Insomnia often co-occurs with nocturia, where there is a sensation of the full bladder that leads to the need to wake up to urinate at night (nocturia).³ Nocturia is the most commonly reported reason for disturbed sleep at night, more often than pain.⁴

How to cite this article: Helty H, Sitorus R, Haryanto H. Impact of applying the theory of human becoming and self-care deficit theory of nursing on insomnia in after stroke urinary incontinence patients. *Front Nurs*. 2024;3:259–266.

*Corresponding author.

E-mail: heltyhelty75@gmail.com (H. Helty).

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Insomnia can exacerbate problems related to brain damage and can complicate the recovery process.² Insomnia also has consequences for functional disorders, immune function, impaired concentration and memory, increased risk of falling, and psychological disorders.⁵ Post-stroke insomnia can worsen post-stroke depression.⁶ Several studies have stated that UI and insomnia affect the quality of life of patients, causing social isolation, financial problems, and physical and psychological fatigue in both patients and caregivers.⁷

Until now, the management of insomnia is still focused on pharmacological agents.⁸ However, these pharmacological agents can cause sedation, tolerance, and dependence.⁸ Several studies recommend cognitive behavioral therapy-insomnia (CBT-i). To date, no trials have specifically investigated the effect of CBT-i on sleep disturbances after stroke.⁹

Management of insomnia in post-stroke UI patients requires comprehensive nursing care. A person living with post-stroke UI will develop skills in dealing with their own condition by trying various ways to cope with the situation (UI) and achieve quality of life.¹⁰ Parse in her theory (human becoming) recommends that individual experiences can be used as a focus in public health nursing.¹¹ The theory of human becoming provides a continuous way of dealing with the realities of life, especially the reality of people experiencing change.¹²

In our previous qualitative study, we found that patients need information about post-stroke UI so that patients can take steps to deal with their post-stroke UI.¹⁰ In addition, patients also exercised self-control, remained enthusiastic in doing the recommended exercises, and continued to carry out daily activities independently according to their abilities, as well as received family support and attention from friends.¹⁰

Several studies have applied Parse's theory to improve the quality of life of patients and the quality of health nursing services.^{12,13} Human becoming theory emphasizes person-centered care and coherence with chronic disease management.¹⁴ However, there has been no research on its application to post-stroke UI patients until now. Considering the physical limitations (paresis and hemiparesis) experienced by after-stroke UI patients, the application of Orem's theory also needs to be used in this study. According to the theory of Orem, barriers to self-care are related to limited knowledge, lack of social support, lack of access to care, or high costs. Physical limitations and fatigue in stroke patients also contribute to sleep disturbances.¹⁵

The innovation of this research is the emphasis on the application of a combination of human becoming theory and Orem theory in the nursing care of post-stroke UI patients who experience insomnia. The nursing interventions provided are based on these two theories which

include health education, skills training to overcome health problems experienced, encouraging patients to remain enthusiastic and think positively, and carrying out daily activities according to ability. This research intended to determine the impact of applying the theory of human becoming and self-care deficit theory in overcoming insomnia on patients of UI after stroke.

2. Methods

2.1. Research design

A quasi-experimental with using a non-equivalent control group pretest-posttest design was conducted in this study. This research was conducted from September 2020 to January 2021 in 4 hospitals in Southeast Sulawesi Province, Indonesia. The hospitals were the Regional General Hospital of Kendari City, Dr R Ismoyo Hospital, Regional General Hospital of Bahteramas, and Aliyah I Hospital.

2.2. Sample size

The study participants consisted of post-stroke UI patients who experienced insomnia from 4 public hospitals. Fifty-six patients were selected by convenience sampling, then divided into two groups (intervention group and control group), each group consisting of 28 patients. Grouping of patients is done using hospital matching. All participants who met the inclusion criteria continued to undergo post-stroke rehabilitation therapy and the inclusion criteria are 35–75 years old, history of stroke, experience of UI of post-stroke, clinically significant self-reported poor sleep, medically stable condition, conscious, and had no cognitive impairment. The exclusion criteria were current sleep apnea. Participants in the intervention group received nursing care that applied the theory of human becoming and self-care deficit theory of nursing. Meanwhile, participants in the control group only received standard interventions in the form of a medical rehabilitation program and drug therapy.

2.3. Nursing practice

The nursing intervention given to the intervention group was a nursing intervention that was applied using the human becoming theory and self-care deficit theory of nursing. This intervention was carried out by researchers and research assistants (nurses) to UI after stroke patients holistically and continuously until at the patient's home. This intervention was carried out for 4 weeks and was divided into 5 activities.¹⁶

The first activity was carried out in the first week in the hospital before the patient was discharged from the

hospital. Interventions at this stage include health education about insomnia in IU patients after stroke. The first measurement (pre-test) insomnia score was measured before this intervention was carried out.

The second activity was carried out in the first and second weeks at the hospital before the patient went home and continued at the patient's home. Interventions in this second stage included providing skills training in the form of bladder retraining exercises, pelvic floor muscle training, and joint range of motion exercises; teaching self-control exercises by encouraging positive thinking, doing distraction techniques, doing breathing exercises, and sleep hygiene. At this stage, the family was also taught about this and was recommended to help the respondent do it. Respondents were encouraged to always be enthusiastic about doing the exercises that have been taught.

The third activity was carried out in the third week at the patient's home in the form of assistance in implementing the skills that have been taught. At this stage, the respondent was also advised to carry out daily activities at home according to the respondent's ability. The length of time for mentoring was carried out according to the achievement of the patient's ability, namely until the patient was able to do the exercise independently.

The fourth activity was monitoring carried out at the patient's home through home visits and telephone calls in the third and fourth weeks. In this activity, researchers also identified problems faced by respondents and helped to overcome them.

The fifth activity was in the form of follow-up carried out at the respondent's home through home visits at the end of the fourth week. At this stage, the researcher evaluated the respondent's ability and motivated the respondent to always take the actions that have been taught. The second measurement (post-test) of insomnia score was performed 30 min after follow-up and the third measurement was performed 4 weeks after the second measurement (after post-test).

Before the intervention was carried out, first the researcher and the research assistant (nurse) identified the respondent's health condition; the UI status was observed using a bladder diary assessment and the respondent's sleep pattern was observed (using the sleep diary observation sheet). Then, researchers and respondents determined the treatment goals to be achieved using the specific, measurable, achievable, realistic, and there is a time limit (SMART) method.

2.4. Instruments

The data of sociodemographics included age, sex, recent education history, marital status, employment

status, and income. Clinical information included comorbidity, stroke type, UI type, UI severity, and insomnia severity. Insomnia score measurement used the Pittsburgh Sleep Quality Index (PSQI). The PSQI is an effective instrument used to measure sleep quality and patterns in older adults. This instrument measures 7 domains: subjective sleep quality, sleep latency, sleep duration, efficiency of sleep habits, sleep disturbances, use of sleep medication, and daytime dysfunction over the past month. Answer scores are based on a Likert scale from 0 to 3, of which a score 3 reflects extreme negative. If the total score is "5" or >5, it indicates "poor" sleep. PSQI had an internal consistency and reliability coefficient (Cronbach's alpha test) of 0.78.¹⁷

2.5. Ethical considerations

This study was approved by the ethics committee of the Nursing Faculty University of Indonesia (IRB approval number: SK-242/UN2.FI2.DI.2.1/ETIK.FIK.2019). Written informed consent from each participant was also obtained. Participants took part in this study of their own volition without coercion. Participants have the right to withdraw during the research. All information submitted by participants is kept confidential.

2.6. Data analysis

Research data analysis was carried out using IBM SPSS Version 24 (IBM Corporation, Armonk, NY, United States). Descriptive analysis was used to describe the participants' sociodemographic and clinical information. In this study, the Shapiro–Wilk test was used to test the normality of the experimental group and the control group. The test of homogeneity in both groups used the Levene test. The parametric test used is the independent-*t* test and repeated measure analysis of variance (ANOVA).

3. Results

In this study, the majority of participants were women (57.1%). The mean age of participants was 55.80 years (standard deviation [SD] = 11.79, range = 35–75 years old). Participants in the experimental group were 56.46 years (SD = 12.06, range = 35–75 years old) and 55.14 years in the control group (SD = 11.71, range = 35–73 years old). All participants had ischemic stroke (100.0%). The majority of participants had left-sided hemiparesis (55.4%), had a history of hypertension (41.1%), had mixed incontinence (53.6%), with a very severe level of incontinence (50.0%), and the most experienced moderate insomnia with an average insomnia severity score of 16.34 (SD = 4.20, range = 8–21).

Data in the intervention group and control group were homogeneous ($P > 0.05$) (Table 1).

Statistical analysis revealed that the mean score of insomnia increased in both groups on the first and third measures. There were significant differences in the second and third measurements ($P < 0.001$). There were interactions between the measurements (first, second, and third measurements) and the groups (experimental and control) based on the results of the repeated measures ANOVA ($P < 0.001$). The intervention was effective in overcoming insomnia by 4.11 times in the second measurement and 5.82 times in the third measurement according to the results of pairwise comparisons (Table 2).

The mean score of all insomnia assessment items decreased in the third measurement in the intervention group. Of the 7 insomnia assessment items in the intervention group, the biggest decrease was sleep efficiency (decreased mean score 2.29 with a SD of 0.21). There was a significant difference between the first and third measurements on all items measuring insomnia in the intervention group. However, in the control group, not all assessment items experienced a decrease in insomnia score in the third measurement. The assessment item that did not experience a decrease in score was the use of sleep medication (the mean score increased by 0.07 with a SD of 0.26). The statistical test results obtained a P -value of 0.326 (on the sleep quality item)

Characteristics of participants	Total	Intervention group (n = 28)	Control group (n = 28)	<i>P</i>
<i>Age (year)</i>	55.80 ± 11.79	56.46 ± 12.06	55.14 ± 11.71	0.906
<i>Sex</i>				0.589
Men	24 (42.9)	11 (45.8)	13 (54.2)	
Women	32 (57.1)	17 (53.1)	15 (46.9)	
<i>Recent education level</i>				0.491
Bachelor's degree	22 (39.3)	12 (42.9)	10 (35.7)	
High school	23 (41.1)	9 (32.1)	14 (50.0)	
Junior high school	7 (12.5)	4 (14.3)	3 (10.7)	
Elementary school	4 (7.1)	3 (10.7)	1 (3.6)	
<i>Marital status</i>				0.962
Married	27 (48.2)	14 (50.0)	13 (46.4)	
Not married (widow/widower)	25 (44.6)	12 (42.9)	13 (46.4)	
Single	4 (7.1)	2 (7.1)	2 (7.1)	
<i>Hemiparesis type</i>				0.788
Left-sided hemiparesis	31 (55.4)	15 (53.6)	16 (57.1)	
Right-sided hemiparesis	25 (46.6)	13 (46.4)	12 (42.9)	
<i>Comorbidities</i>				0.297
Hypertension	23 (41.1)	15 (53.5)	8 (28.6)	
Hypertension + DM	17 (30.4)	7 (25.0)	10 (35.7)	
Hypertension + DM + hypercholesterolemia	13 (23.1)	5 (17.9)	8 (28.6)	
Hypertension + DM + pneumonia	3 (5.4)	1 (3.6)	2 (7.1)	
<i>UI type</i>				0.848
Functional	7 (12.5)	3 (10.7)	4 (14.3)	
Mixed (functional + stress)	19 (33.9)	9 (32.1)	10 (35.7)	
Mixed (functional + stress + urgency)	30 (53.6)	16 (57.1)	14 (50.0)	
<i>Level of severity UI</i>				0.705
Moderate	8 (14.3)	5 (17.9)	3 (10.7)	
Severe	20 (35.7)	9 (32.1)	11 (39.3)	
Very severe	28 (50.0)	14 (50.0)	14 (50.0)	
<i>Insomnia severity</i>	16.34 ± 4.20	16.18 ± 4.30	16.50 ± 4.17	0.778

Note: DM, diabetes mellitus; M, mean; SD, standard deviation; UI, urinary incontinence.

Table 1. Homogeneity test and distribution of participants characteristics, n (%) or M ± SD.

Insomnia	Intervention group (n = 28)	Control group (n = 28)	<i>t</i>	<i>P</i> -value
	<i>M</i> ± <i>SD</i>	<i>M</i> ± <i>SD</i>		
1st measurement (before intervention)	14.11 ± 1.66	14.46 ± 1.75	0.78	0.438
2nd measurement (after intervention)	10.00 ± 1.12	13.46 ± 1.93	8.19	<0.001
3rd measurement (4 weeks after intervention)	5.57 ± 1.03	11.36 ± 1.57	16.29	<0.001

Note: Tests of within-subject effect (Greenhouse–Geisser): *MS* = 790.598; *F* = 177.392; *P* = < 0.001; Tests of between-subject effect: *MS* = 22,195.006; *F* = 1670.714; *P* = < 0.001; Pairwise comparisons: Mean difference in measurement 1 and 2 between groups (2.55, *P* = < 0.001), Mean difference in measurement 2 and 3 between groups (5.82, *P* = < 0.001); *M*, mean; *MS*, mean square; *SD*, standard deviation.

Table 2. Differences in insomnia between measurements in the two groups (*N* = 56).

Assessment items	Intervention group (n = 28)				Control group (n = 28)			
	Measurement		<i>T</i>	<i>P</i>	Measurement		<i>t</i>	<i>P</i> -value
	1st measurement (<i>M</i> ± <i>SD</i>)	3rd measurement (<i>M</i> ± <i>SD</i>)			1st measurement (<i>M</i> ± <i>SD</i>)	3rd measurement (<i>M</i> ± <i>SD</i>)		
Sleep quality	2.00 ± 0.00	0.93 ± 0.26	21.62	<0.001	2.00 ± 0.00	1.96 ± 0.19	1.00	0.326
Sleep latency	2.61 ± 0.49	1.21 ± 0.42	14.82	<0.001	2.75 ± 0.44	2.46 ± 0.58	2.52	0.018
Sleep duration	1.93 ± 0.26	1.46 ± 0.51	4.84	<0.001	1.86 ± 0.45	1.61 ± 0.49	2.55	0.017
Sleep efficiency	2.43 ± 0.57	0.14 ± 0.36	22.63	<0.001	2.36 ± 0.68	0.96 ± 0.43	9.99	<0.001
Sleep disturbance	2.46 ± 0.58	1.00 ± 0.00	13.45	<0.001	2.50 ± 0.51	1.89 ± 0.32	6.46	<0.001
Use of sleep medication	0.21 ± 0.42	0.00 ± 0.00	2.71	0.011	0.00 ± 0.00	0.07 ± 0.26	1.44	0.161
Daytime dysfunction	2.79 ± 0.42	0.82 ± 0.55	18.04	<0.001	2.89 ± 0.32	2.39 ± 0.49	5.19	<0.001

Note: *SD*, standard deviation.

Table 3. Comparison of insomnia scores on the first and third measurements in the 2 groups (*N* = 56).

and 0.161 (on the use of the sleep medication item) so it can be concluded that there was no significant difference in the sleep quality and use of sleep medication items between the first and third measurements in the control group (Table 3).

4. Discussion

The state of insomnia is more associated with physiological and psychological changes experienced by patients and these changes are prone to triggering sleep disturbances in the early phase of stroke recovery.¹⁸ Thirty-eight to 50% of patients with subacute stroke report poor sleep quality.¹⁹ Major characteristics of insomnia include dissatisfaction with the quantity and quality of sleep, and a person would indicate one or more of the following symptoms: difficulty initiating sleep, difficulty maintaining sleep (frequent or prolonged awakening), difficulty back to sleep again, and waking up earlier than desired after a full sleep of only 3–5 h.²⁰

The measurement of insomnia after the intervention (2nd measurement) and 4 weeks after the intervention (3rd measurement) showed a significant difference. The

results of this study were in line with other studies showing that sleep structure undergoes the most changes for several days after stroke, indicating a trend toward normalization/recovery.¹⁹ In this study, the average decrease in insomnia scores in the intervention group was greater than the control group, namely 4.11 at the 2nd measurement and 4.43 at the 3rd measurement, while in the control group, it was 1.00 at the 2nd measurement and 2.10 at the 3rd measurement.

Although there were not many studies have investigated the association between post-stroke sleep changes and neurological recovery, however, sleep deprivation/after stroke insomnia and better sleep recovery over time appear to be associated with better neurological and cognitive recovery.¹⁹ A higher score on the Insomnia Severity Index in the first 2 weeks of stroke is associated with lower extremity motor function.¹⁹ This makes it clear that this model includes not only interventions related to insomnia but also nursing interventions related to improving the patient's functional abilities such as joint movement exercises. Management of UI after stroke is focused on improving functional ability, both functional ability to urinate and functional ability to walk.²¹

Sleep disturbances are more common in patients who are unable to walk for a month after stroke.²² At 1 month after stroke, patients who were unable to walk experienced more sleep problems than patients who were able to walk.²³ Several observational studies have shown that sleep disturbance was also a predictor of poor functional outcome in post-stroke patients, increasing the risk of short-term neurological damage, and experiencing long-term dependence.²⁴ This strengthens the findings of this study that the decrease in insomnia scores in the control group was not as large as the decrease in the intervention group. The results of the researcher's observation that respondents in the control group in the fourth week (post-test) have not shown maximum improvement in the ability to walk and the ability to resist the urge to urinate so functional incontinence still occurs.

In this study, before the respondents were taught the necessary skills training in overcoming post-stroke insomnia, the respondents were given health education. Sleep hygiene education is effective in improving sleep quality and is an approach that can be taken to help insomnia patients improve their sleep.²⁵ Sleep hygiene interventions such as avoiding caffeine before bed and reducing light at night.

Health education provided can increase the knowledge of respondents. The patient's knowledge and desire to recover becomes the basis for the patient to transfer or transform his/her health pattern.¹⁰ In human becoming theory, it is stated that the transformation of health patterns can occur through several things, namely when individuals find insights relating to themselves that were beforehand unclear and when they find ways to achieve the hopes and dreams, they cherish.^{26,27} The hope of recovery makes respondents always carry out recommended interventions to overcome post-stroke insomnia and this becomes a strength for respondents when dealing with their illness. In the human being theory, it is also stated that health is a personal commitment in which individuals participate in creating their health. UI management requires patients to be motivated to actively participate.²⁸ This is influenced by imaging, valuing, revealing—concealing, enabling—limiting, and powering the individual.^{27,29}

Individual powering relates to acts of self-control. Self-control describes how a person selects and finds ways to face the situations they find themselves in.¹⁶ The ways that are carried out are related to the values of beliefs they hold. In Parse's theory, it is stated that beliefs reflect what is important in a person's life, in this case, related to his/her health, which becomes a reference for a person to make choices about how to think, act, and feel.³⁰

One of the self-control measures is to use distraction techniques. Distraction techniques can inhibit the transmission of impulses from the thalamus to cortical structures by activating the limbic system at the front of the brain.³¹ Coordination between the brainstem and the cortex helps to ensure that urination occurs at an appropriate time, voluntary micturition control needs input from the forebrain.³² Distraction techniques can distract the brain to eliminate things that can interfere with sleep, including the urge to urinate. When the bladder sends a signal to the brain to urinate, the brain can focus on other things, reducing the need to urinate. Thinking too much about urinating can create an impulse to urinate.³³

In Orem's theory (self-care deficit theory of nursing), Orem believes that individuals have the ability to care for themselves and others. If these abilities are distorted, so nurses help them to retrieve their abilities by providing direct care.³⁴ The supportive-educational system in Orem's theory states that individuals can do or can learn to take necessary actions externally or through therapeutic self-care but cannot do so without help.²⁷ Supportive educative is a form of assistance given to patients in the form of educational support so that patients are able to carry out nursing intervention independently.³⁵ For this reason, guidance from health workers and families is needed. In this study, the family is involved as caregiver in carrying out the recommended nursing intervention. However, in carrying out self-care activities, emphasis is placed on the active role of the patient rather than the passive role.

Family, spouse, friend, or health professional support is often recommended as a source of emotional, instrumental, informational, and affirmative support for people with chronic disease conditions.³⁶ Family support programs are an effective way to meet patient needs. Social support plays an important role in improving the quality of life of post-stroke UI patient.³⁷ Orem believes that the lack of social support in patient care can lead to limitations in self-care behaviors.²⁷ Family and other social support work together and collaborate to give a sense of safety and compassion for chronically ill family members in dealing with their illness.³⁸

The limitation of this study was the number of samples, so it needed more numbers to generalize the findings. The first measurement was carried out in the hospital, while the second and third measurements were carried out in the patient's home. This research plays a role in improving the quality of nursing care, especially the quality of nursing care in post-stroke UI patients who experience insomnia. For this reason, the results of this study need to be disseminated to nurses who care for UI patients experiencing insomnia after the stroke so that nurses can increase their knowledge about this model

of nursing care and thus make it easier to apply it to improve the patient's quality of life.

5. Conclusions

The application of the human becoming theory and the self-care deficit theory of nursing in nursing care in this study could significantly reduce the insomnia score of post-stroke UI patients. This study can be used as a guide for nurses, patients, and families in managing insomnia. The use of nursing theory in nursing practice can systematize nursing care plans and organize professional knowledge into a conceptual framework, as

well as provide effective guidance for nurses on what to do. This study can also be used to improve the care of post-stroke UI patients.

Ethical approval

This study was approved by the ethics committee of the Nursing Faculty University of Indonesia (IRB approval number: SK-242/UN2.FI2.DI.2.1/ETIK.FIK.2019).

Conflicts of interest

All contributing authors declare no conflicts of interest.

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