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Case Study: Progressive Muscle Relaxation to Reduce Head Pain in Elderly Hypertension Patient

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ABSTRACT:
Background: Hypertension is one of the most common degenerative diseases suffered by the elderly, with headache as one of the common symptoms. Pharmacological management of headache pain often causes side effects, so that alternative non-pharmacological therapies are needed that are safe, inexpensive, and effective.
Aims: This study aims to determine the effectiveness of progressive muscle relaxation intervention in reducing headache pain in elderly patients with hypertension.
Methods: This study used a case study approach with participants of an elderly patient with hypertension at PPSLU Cepiring, Kendal. The intervention in the form of progressive muscle relaxation was carried out for six consecutive days. Data were collected through observation of blood pressure and pain scale before and after the intervention, as well as interviews on the subject's condition.
Result: The results showed that the subject's blood pressure decreased from 158/100 mmHg to 140/90 mmHg. The headache pain scale also decreased from 6 to 2. In addition, the subject felt an increase in comfort, sleep quality, and emotional relaxation.
Conclusion: Progressive muscle relaxation is proven effective as a nonpharmacological intervention in reducing head pain and blood pressure in elderly patients with hypertension. This technique can be integrated in gerontic nursing services to improve the quality of life of the elderly holistically.

Keywords: Hypertension; Elderly; Headache; Progressive Muscle Relaxation; Gerontic Nursing

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INTRODUCTION

Hypertension is one of the diseases commonly found in the elderly due to the deterioration of body functions, especially blood vessels (Adam, 2019; Afriani et al., 2023; Ariyanti et al., 2020; Purwono et al., 2020) . The increasing prevalence of hypertension with age poses a serious threat to the quality of life of the elderly. In fact, hypertension is known as *a silent killer* because it often shows no symptoms but can trigger dangerous complications such as stroke and heart failure (L.o, 2022; Maulidina et al., 2023; Primantika & Noorratri, 2023) . Headache is one of the clinical symptoms that often accompanies hypertension, especially in advanced stages when blood pressure reaches significant levels (Husaini & Fonna, 2024; Saputri et al., 2021; Susanti et al., 2024) .

Although hypertension can ideally be controlled with medication and lifestyle changes, the reality is that many elderly people do not fully understand or carry out optimal blood pressure management. In practice, the management of headache pain due to hypertension among the elderly still relies heavily on pharmacological therapy, which often causes side effects (Kharisma, 2022; Morika & Yurnike, 2021; Nisa' & Pranungsari, 2021; Nurhidayati et al., 2019) . This condition shows a gap between the ideal of holistic pain management and the practice that still dominantly uses a medicinal approach.

This situation opens up opportunities to apply alternative approaches such as non-pharmacological therapies that are safe, inexpensive, and easy to do. One method that has proven effective is progressive muscle relaxation, a technique that emphasizes the gradual relaxation of the body's muscles to create physical and psychological calm (Azizah et al., 2021; Ekarini et al., 2019; Ilham et al., 2019; Rahayu et al., 2020) . This therapy is believed to reduce blood pressure through a vasodilatory mechanism and help reduce headache complaints significantly.

Previous studies have shown that progressive muscle relaxation is effective in reducing systolic and diastolic blood pressure and improving the quality of life of hypertensive patients. However, there are still limited studies that specifically highlight its impact on reducing headache pain in elderly people with hypertension. Therefore, this study aims to address this gap by providing empirical evidence from direct practice in the field, especially in elderly people in social service centers.

The selection of progressive muscle relaxation as an intervention variable in this study is based on its characteristics that are easily practiced by the elderly, do not require special tools, and can be done independently. In addition, this therapy is educative and can be used as part of health promotion in the elderly service environment. These advantages make progressive muscle relaxation relevant as an intervention option in this case study.

The purpose of this study was to explore the effectiveness of progressive muscle relaxation techniques in reducing headache pain in elderly hypertensive patients. This study is expected to contribute to enriching non-pharmacological strategies in gerontological nursing as well as being the basis for developing holistic interventions in the management of hypertension in the future.

METHOD

Research Design

This study used a *case study* design with a qualitative approach. The aim is to describe the management of head pain in elderly patients with hypertension through progressive muscle relaxation interventions in depth and contextually.

Participant

The participant in this study was an elderly patient with hypertension who had complaints of headache and was undergoing treatment at the Cepiring Social Service Center for the Elderly (PPSLU), Kendal Regency. Subjects were selected based on certain inclusion criteria relevant to the study objectives.

Population and the Methods of Sampling Instrumentation (Sample of Questions, Scoring Method, and Psychometric Properties)

The theoretical study population was elderly patients with hypertension. The sampling method used purposive sampling technique based on specific criteria, namely elderly people with a diagnosis of hypertension who experience headache and are able to follow relaxation procedures. Instruments in data collection include:

- Pain level observation sheet (using verbal pain scale),
- Record of blood pressure measurements,
- Semi-structured interviews regarding pain experience and intervention effects. Instrument validity was confirmed through consultation with gerontic nursing experts and a limited field readability test. Reliability was obtained through data triangulation (observation, interview, and documentation) to maintain the validity of the findings.

Instrument

The tools used include:

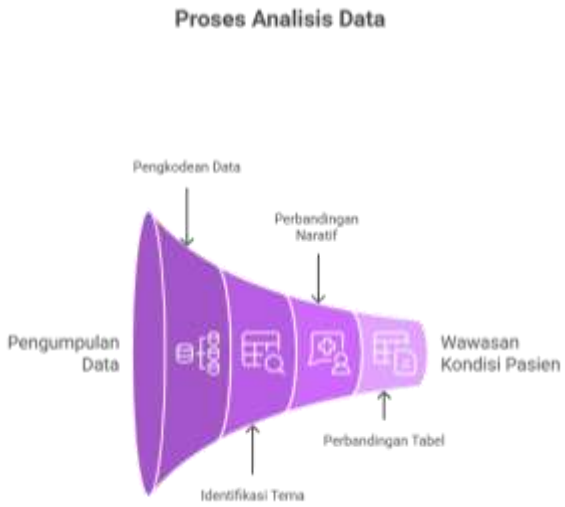
- Facial expression and TTV (vital signs) observation sheet,
- Intervention consent form,
- SOP for the implementation of progressive muscle relaxation,
- Interview guide and patient's daily reflective journal.

Procedures and If Relevant, the Time Frame

The procedure began with establishing a trusting relationship with participants, explaining the purpose and benefits of progressive muscle relaxation, and obtaining informed consent. The intervention was carried out for 6 consecutive days with a duration of 15-20 minutes per session. Data was collected before and after the intervention through measurement of blood pressure and pain scale.

Analysis Plan

Data were analyzed using qualitative descriptive techniques (Ardiansyah et al., 2023; Rifa'i, 2023; Waruwu, 2024) . Information from interviews, observations, and documentation was coded and categorized to find key themes related to changes in patients' conditions after the intervention. Comparisons of blood pressure and pain intensity before and after treatment were described in simple narratives and tables.



RESULTS AND DISCUSSION

Result

This study was conducted on an elderly patient with hypertension with complaints of headache who was treated in the Sembodro room of the Elderly Social Service Center (PPSLU) Cepiring, Kendal. The subject is an elderly woman who has been diagnosed with hypertension for the past few years. Patient characteristics show complaints of recurrent headaches, especially in the back of the head and accompanied by unstable blood pressure. Prior to the progressive muscle relaxation intervention, the patient had a blood pressure of 158/100 mmHg and reported headache pain with a pain scale of 6 (moderate pain).

Initial observations showed that the patient's facial expression was tense, agitated, and easily fatigued. From the TTV (Vital Signs) measurement, the pulse rate and blood pressure were above the normal threshold. The interview results showed that the patient felt uncomfortable, had difficulty sleeping, and felt depressed by her health condition. This data became the basis for implementing progressive muscle relaxation interventions as part of non-pharmacological management to reduce headache pain.

The progressive muscle relaxation intervention was implemented for six consecutive days with a duration of 15-20 minutes per session. The technique used refers to the SOP that has been developed, including exercises to tense and relax the muscles sequentially from head to toe, accompanied by deep breathing techniques. The intervention was conducted in a quiet environment with direct guidance by the researcher.

After day 3 of the intervention, the patient showed a decrease in headache intensity from a scale of 6 to 4 (mild pain), and facial expressions appeared more relaxed. The patient also reported feeling more comfortable, emotionally calmer, and had improved sleep quality. This indicates that progressive muscle relaxation began to have a positive effect on the patient's subjective and physiological conditions.

On day 6, the patient's blood pressure was recorded at 140/90 mmHg, showing a significant decrease compared to before the intervention. The headache pain scale also decreased to 2 (very mild pain). The patient revealed that the relaxation exercise made her feel more refreshed, less tense, and better able to control her emotions when symptoms appeared. Overall, there was a decrease in headache pain intensity and stable blood pressure from day to day after the implementation of the intervention.

These findings reinforce the theory that progressive muscle relaxation is effective as a non-pharmacological therapy to lower blood pressure and reduce headache pain in elderly hypertensive patients. The results of this study also provide empirical evidence that a relaxation-based nursing

approach can support the holistic care of gerontic patients, especially in improving their comfort and quality of life.

Table 1. A Brief Account of the Blood Pressure and Pain Scale During the Intervention Phase

Day	Systolic/Diastolic (mmHg)	Headache Pain Scale (0–10)	Observational Notes
1	158/100	6 (Moderate)	Tense expression, complaints of fatigue, poor sleep
2	152/98	5 (Moderate)	Slightly calmer, begins to follow instructions well
3	148/96	4 (Mild)	Facial relaxation observed, better sleep quality
4	146/94	3 (Mild)	Improved comfort, emotionally more stable
5	142/92	2–3 (Very mild–mild)	Headache rarely occurs, patient more active

Discussion

The results showed that providing interventions in the form of progressive muscle relaxation consistently for six days had a positive impact on reducing blood pressure and head pain in elderly patients with hypertension (Juniarti et al., 2021; Karang & Rizal, 2017; Reza Novizar Syah et al., 2023) . The decrease in blood pressure from 158/100 mmHg to 140/90 mmHg, as well as the head pain scale from 6 to 2, illustrates that the patient's physiological condition has improved significantly. This finding can be explained through the mechanism of the parasympathetic nervous system that is activated when the body is relaxed.

Physiologically, progressive muscle relaxation increases parasympathetic nervous system activity and suppresses sympathetic nerve activity (Asyari et al., 2024; Syisnawati et al., 2022; Yudanari & Puspitasari, 2022) . This causes the release of acetylcholine which works to reduce heart rate and blood pressure, and causes vasodilation of blood vessels. This mechanism is in accordance with the autonomic system theory which states that a relaxed state reduces the contractility of the heart muscle and widens the arterioles, so that blood flow becomes smoother and blood pressure naturally decreases (Akbar et al., 2021; Budhiartie & Nasser, 2017; Widjaja et al., 2025) . In addition, the release of endorphins when the body feels relaxed also helps relieve pain.

However, beyond the physiological and psychological mechanisms, an individual patient's characteristics may also play a critical role in treatment outcomes. The patient in this study demonstrated consistent motivation and a willingness to participate and try new techniques. These intrinsic motivational factors could have enhanced the perceived effectiveness of the intervention. According to the literature, personality traits such as openness to experience and emotional stability often correlate with better adherence to self-care therapies and stress-reducing practices.

Psychologically, progressive muscle relaxation is able to reduce emotional tension and anxiety that is often experienced by elderly people with hypertension. The theory of stress and emotion regulation states that relaxation can inhibit the stress response and strengthen self-control over pain stimuli. A calmer mental state also plays a role in reducing the intensity of head pain which was previously the main complaint of patients (Ford & Troy, 2019; Haeyen, 2024; Sahari & Paputungan, 2023) . In other words, this approach not only works biologically, but also positively affects the psychological and emotional aspects of patients.

Additionally, social support from caregivers and institutional staff at the senior center may have contributed to the therapeutic outcome. Empathetic communication, structured daily routines, and supportive environments can reinforce the effectiveness of interventions by creating a secure

psychological space, even subtly. The positive reinforcement and attention received during the intervention may have also triggered a placebo effect, in which the patient's expectation of improvement contributes to actual symptom reduction. While this does not diminish the effectiveness of progressive muscle relaxation, it underscores the multifactorial nature of recovery.

These factors suggest that the success of the intervention is not only a function of the technique used, but also of the context, mindset, and environment. Thus, future studies should assess and control for patient-level variables, such as personality, baseline motivation, and level of social support, when evaluating the impact of non-pharmacological interventions.

CONCLUSION

Based on the results and discussion, it can be concluded that progressive muscle relaxation intervention is effective in reducing head pain in elderly patients with hypertension. This technique works through physiological mechanisms in the form of activation of the parasympathetic nervous system which causes vasodilation and a decrease in blood pressure, and produces psychological effects in the form of a sense of calm and comfort. The patient's blood pressure showed a significant decrease from 158/100 mmHg to 140/90 mmHg, and the head pain scale was reduced from 6 (moderate pain) to 2 (very mild pain). These results are in line with neurophysiology theory which states that relaxation conditions reduce muscle contractility and slow sympathetic activity, thereby reducing systemic pain sensations.

Thus, progressive muscle relaxation can be used as one of the applicable and inexpensive non-pharmacological interventions for the management of headache pain due to hypertension in the elderly. This technique is very useful especially in gerontic nursing services that prioritize a holistic approach. This study provides a theoretical and practical basis for health workers, especially nurses, to develop self-care strategies based on relaxation techniques in managing blood pressure and increasing the comfort of elderly patients.

AUTHOR CONTRIBUTION STATEMENT

WS, responsible for setting the background, collecting field data, implementing the intervention, and writing up the results and discussion. TA, played a role in methodological guidance, instrument validation, data analysis, and revision of scientific substance in all parts of the paper.

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