



**ANALYSIS OF THE EFFECT OF SPEECH THERAPY SERVICES ON POST-STROKE PATIENTS' QUALITY OF LIFE THROUGH THE ROLE OF FAMILY IN MEDICAL REHABILITATION**

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**ABSTRACT**

Stroke is a neurological condition that often leads to brain dysfunction, resulting in paralysis, speech impairments, and a significant decline in patients' quality of life. Speech therapy is one of the critical rehabilitation methods to restore communication abilities in post-stroke patients, which subsequently improves their quality of life. Furthermore, family support plays a vital role in the success of rehabilitation, contributing emotionally, socially, and instrumentally. This study aims to analyze the effect of speech therapy services on the quality of life of post-stroke patients, with family involvement as a mediating variable. A quantitative research method with a cross-sectional design was employed. A total of 100 post-stroke patients undergoing medical rehabilitation were selected using purposive sampling. Data were collected through questionnaires. This study confirms the validity and reliability of the measurement scale, with all variables meeting convergent validity and composite reliability criteria. The data analyzed using path analysis to evaluate direct and indirect relationships between variables. The results revealed that speech therapy services significantly and positively impact patients' quality of life ( $p < 0.05$ ). Family involvement was also found to have a significant impact, both directly on patients' quality of life and as a mediator that enhances the effectiveness of speech therapy services. The study concludes that optimal speech therapy services, combined with active family involvement, can significantly improve the quality of life of post-stroke patients. This study recommends increasing the number of speech therapists and actively involving families in rehabilitation programs for stroke patients at Ngudi Waluyo General Hospital.

Keywords: family role; medical rehabilitation; quality of life; speech therapy; stroke

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**INTRODUCTION**

Speech therapy is a professional healthcare service based on scientific knowledge and technology in communication (including language, speech, voice, rhythm/fluency) and swallowing disorders. It is aimed at individuals, families, or groups to enhance health efforts affected by anatomical, physiological, psychological, and sociological disorders (Ministry of Health Regulation No. 24, 2013). Post-stroke patients often experience hemiparesis, aphasia, facial droop, limb weakness, body coordination issues, mental changes, emotional disturbances, communication disorders, and sensory loss. These complications negatively impact patients' quality of life, as they hinder daily activities (Astriani et al., 2019). Stroke is commonly caused by high blood pressure, which increases vascular damage and may trigger blood vessel rupture (Astriani et al., 2019). Some of the signs involve sudden fatigue in the arm, leg, or face (usually on one side), trouble speaking or comprehending others, vision issues, lightheadedness, unsteadiness, excruciating headaches, and unconsciousness (Yulianto et al., 2021). According to the World Stroke Organization, there are 13.7 million new stroke cases annually, with 5.5 million deaths. Stroke incidence increases with age, with 60% of cases occurring in

individuals under 70 and 8% in those under 44 (Lindsay et al., 2019). In Indonesia, stroke cases reached 1.7 million in 2020, with elderly stroke patients being the highest in Asia. Stroke ranks second as a cause of death for those over 60 and fifth for individuals aged 15-59. The national stroke prevalence increased to 12.1 per 1,000 people, with a mortality rate of 21.1% (Risikesdas, 2018).

Quality of life (QoL), according to the World Health Organization, QoL refers to an individual's perception of their position in life within the context of their culture, values, goals, and expectations (Rezaeipandari et al., 2020). QoL is multidimensional, encompassing physical health, emotional well-being, social relationships, and environmental interactions (Recabarren et al., 2019). Stroke has a profound impact on multiple functions, including motor, sensory, cognitive, and speech abilities, leading to a reduced quality of life for those affected. Speech impairments, such as dysarthria or aphasia, are prevalent and greatly hinder communication, disrupting social interactions and personal relationships (Chiaramonte et al., 2020). Larweh et al., (2025) suggest that individuals with aphasia and their caregivers face substantial challenges in communication and a notable decline in quality of life. Post-stroke aphasia is associated with a reduced QoL and higher risk of depression (Bueno-Guerra et al., 2024). Speech therapy aims to address communication disorders and restore speech functions. It involves techniques to improve language, speech, voice, and fluency, enabling patients to interact naturally and enhance their psychosocial well-being (Ginting et al., 2023).

Family support significantly influences rehabilitation success. Families play a vital role in providing emotional security and motivation for stroke patients (Siregar, 2023). Emotional support, expressed through affection and motivation, helps patients stay committed to their recovery (Djuhendi & Popon, 2021). Although stroke poses significant physical and cognitive challenges, patients can still achieve a good quality of life with proper support. Family, friends, and medical professionals play essential roles in ensuring stroke survivors remain engaged in social activities and maintain a sense of purpose. Active participation in family and community life fosters well-being and happiness. Research by Sukmawati et al. (2023) highlights the significant impact of education on speech therapy and home-based care in stroke recovery. Another study by Yuniarti & Kariasa (2020) titled "The Role of Family in Self-Management of Post-Stroke Patients" emphasizes the necessity of strong family support for improving self-management skills among stroke patients. Based on these findings, this study aims to analyze the impact of speech therapy services on post-stroke patients' quality of life through the role of family in outpatient rehabilitation at Ngudi Waluyo Wlingi Regional Hospital.

## **METHOD**

This study employs a quantitative research design, utilizing numerical data to examine the relationship between dependent and independent variables. A cross-sectional study approach is applied, with primary data collected through questionnaires completed directly by respondents. The study population consists of stroke patients receiving speech therapy services at RSUD Ngudi Waluyo Wlingi, totaling 115 individuals. The sample size was determined using Slovin's formula with a 10% margin of error, resulting in a minimum sample of 100 respondents. The study employs a non-probability sampling technique, specifically purposive sampling, which selects participants based on predefined criteria. These criteria include being a stroke patient undergoing therapy at the Medical Rehabilitation Clinic of RSUD Ngudi Waluyo Wlingi and experiencing communication disorders, such as speech, language, voice, or swallowing difficulties, for

which they receive speech therapy.

The study relies on both primary and secondary data sources. Data collection primarily involves questionnaires, designed according to established principles to ensure clarity, validity, and reliability. Additionally, observations are conducted following structured guidelines to record and analyze patient behavior and interactions. Independent, dependent, and mediating variables are among the variables under investigation. Using a five-point Likert scale that goes from "strongly disagree" (1) to "strongly agree" (5), the independent variable is speech therapy services (X). Patients' quality of life (Y), which is likewise assessed using a five-point Likert scale, is the dependent variable. Family support (Z), the mediating variable, affects how speech therapy services and patients' quality of life are related. For every variable, operational definitions are given, detailing particular indicators that are assessed using questionnaire items. Data analysis is conducted using Structural Equation Modeling (SEM) with the Partial Least Squares (PLS) approach, which is effective for small sample sizes and complex models. SEM integrates exploratory factor analysis and structural path analysis, enabling simultaneous assessment of measurement and structural models. The analysis process involves multiple stages, including model specification, data examination, estimation, and results evaluation.

The measurement model (outer model) assesses indicator validity and reliability. Convergent validity is evaluated using factor loadings ( $>0.70$ ), and discriminant validity is confirmed if the square root of Average Variance Extracted (AVE) exceeds inter-variable correlations. Reliability is assessed through Composite Reliability ( $>0.70$ ) and Cronbach's Alpha ( $>0.60$ ). The structural model (inner model) evaluates hypothesized relationships among constructs. Path coefficients represent the strength and direction of relationships, with values ranging from  $-1$  to  $1$ , and their significance is tested through bootstrapping. The model's explanatory power is assessed using  $R^2$ , with thresholds of  $0.75$  (substantial),  $0.50$  (moderate), and  $0.25$  (weak). Effect size ( $f^2$ ) is analyzed to determine the impact of predictor variables, classified as small ( $0.02$ ), medium ( $0.15$ ), or large ( $0.35$ ) (Hair et al., 2017). Predictive relevance ( $Q^2$ ) is also examined, with values of  $0.02$ ,  $0.15$ , and  $0.35$  indicating low, moderate, and high predictive power, respectively. Indirect effects are analyzed to determine mediation effects, where the mediator absorbs part of the exogenous variable's influence on the endogenous variable. The significance of mediation is assessed using bootstrapping, and its strength is evaluated based on the proportion of the indirect effect relative to the total effect. The results provide insights into the mechanisms through which speech therapy services influence patients' quality of life, with family support as a mediating factor.

## **RESULT**

The demographic profile of respondents reveals that females constituted the majority (53%), indicating a slightly higher participation rate among women. The educational background of respondents was predominantly higher education (58%), suggesting a well-educated sample group. Regarding age distribution, respondents were fairly evenly divided between the 22-39 and 40-59 age groups, with only 1% being above 60 years old. This indicates that the study primarily engaged middle-aged and younger adults. In terms of occupation, private employees (46%) formed the largest occupational category, followed by civil servants (35%). This reflects the employment landscape of the respondents, where a significant proportion is engaged in formal sector jobs. Overall, the respondent profile suggests a relatively balanced distribution across gender and age, with a well-educated and predominantly employed sample (table 1).

Table 1.  
Classification of Respondents Based on Demographic Characteristics

Category	Subcategory	f	%
Gender	Male	47	47
	Female	53	53
	Total	100	100
Education Level	Higher Education	58	58
	Secondary Education	34	34
	Primary Education	8	8
	Total	100	100
Age Range	22-39 years	49	49
	40-59 years	50	50
	>60 years	1	1
	Total	100	100
Occupation	Civil Servant	35	35
	Private Employee	46	46
	Laborer/Fisherman	12	12
	Unemployed/Retired	7	7

The goal of the study in the hypothesis testing (the bootstrapping) process is to ascertain if the independent and dependent variables significantly influence one another. The path coefficient, which displays the variable's coefficient and the significant value of the t-statistic, is used in hypothesis testing. The significant nature of the parameters gives important details concerning the causal connection between the research factors. The likelihood of 0.05 is the cutoff point for accepting or rejecting the suggested hypothesis. Every proposed association in SmartPLS is statistically tested through simulation, specifically on the sample using the bootstrapping approach. Another goal of bootstrapping is to reduce problems caused by non-normal data. The findings of the hypothesis test show that speech therapy services have a significant impact on quality of life, with a path coefficient of 0.825 and a p-value of 0.000. The T-statistic value is positive at 26.587. These results fall under the typical cutoff point, which is a T-statistic > 1.96 and a p-value < 0.05. As a result, hypothesis 1 is validated, demonstrating that speech treatment substantially and favorably affects quality of life.

Similarly, a p-value of 0.000 and a path coefficient of 0.495 indicate that speech therapy services have an impact on the family role. The T-statistic is 4.772, which satisfies the requirements of T-statistic > 1.96 and p-value < 0.05. As a result, hypothesis 2, which shows that speech therapy services greatly improve the family role, is accepted. As for the effect of family role on quality of life, the T-statistic is 0.631, the p-value is 0.528, and the path coefficient is 0.052. Since these numbers fall short of the significance threshold, hypothesis 3 is rejected. This implies that the involvement of the family does not substantially improve life quality. Additionally, the simultaneous analysis of speech therapy services' effect on quality of life through the family role (X affecting Y via Z) yields a path coefficient of 0.026 and a p-value of 0.001, with a significance level of 0.001 < 0.05. As a result, hypothesis 4 is rejected, indicating that speech therapy services do not significantly impact quality of life through the family role as an intervening factor. This suggests that even in the absence of family involvement as a mediating variable, the quality of life remains unaffected.

Table 2.  
Hypothesis Testing (Bootstrapping)

Variable	Original Sample (O)	Sampel Mean (M)	Standard deviation (STDEV)	T statistic (IO/STDEV)	P-Values
Speech Therapy Services (X) → Quality of Life	0,800	0,799	0,063	12,785	0,000
Speech Therapy Services (X) → Family Role	0,495	0,520	0,104	4,772	0,000
Family Role (Z) → Quality of Life (Y)	0,052	0,052	0,082	0,631	0,528

Table 3.  
Hypothesis Testing Inderect Effect

Variable	Original Sample (O)	Sampel Mean (M)	Standard deviation (STDEV)	T statistic (IO/STDEV)	P-Values
Speech Therapy Services (X) → Quality of Life	0,825	0,830	0,031	26,587	0,000
Speech Therapy Services (X) → Family Role	0,495	0,520	0,104	4,772	0,000
Family Role (Z) → Quality of Life (Y)	0,052	0,052	0,082	0,631	0,528

## DISCUSSION

This study has several objectives, namely to analyze the direct influence of speech therapy services on QoL, the influence of speech therapy services on family role, the influence of family role on QoL, and the influence of speech therapy services on QoL mediated by family role.

### *Speech Therapy Services on QoL*

The results of the hypothesis test show that the path coefficient is 0.825, the p-value demonstrating the impact of speech therapy services on quality of life is 0.000, and the T-statistic is positive at 26.587. These findings therefore support the general rule that states that a T-statistic > 1.96 and a P-value < 0.05. Therefore, it can be said that speech therapy services significantly and favorably impact QoL. According to the study's findings, family roles are positively impacted by speech therapy services. This implies that the QoL increases with the quality of speech therapy treatments. On the other hand, the QoL decreases with the quality of speech treatment services. These results are consistent with the study of Astriani et al. (2019), which found that AIUEO speech therapy significantly improves quality of life. Study by Roberts et al., (2021) stated that early speech and language therapy after stroke significantly improves speaking ability at one-month post-stroke and is positively related to recovery at one-year post-stroke. Another study also stated that the speech-language therapy led to significant supplemental gains in naming recovery in the subacute phase only (Zumbansen et al., 2022). According to Sukmawati et al., (2024), there is a significant influence of education on speech therapy and home care on participants' knowledge.

### *Speech Therapy Services on Family Role*

The findings of the statistical test indicate a positive T-statistic of 4.772, a path coefficient of 0.495, and a p-value of 0.000, which indicates that speech therapy services have an impact on family role. We can conclude that speech therapy services significantly and favorably impact family roles. According to the study's findings, family roles are positively impacted by speech

therapy services. This implies that the degree of family role increases with the quality of speech therapy services. On the other hand, the degree of family role decreases with the quality of speech therapy services. Family involvement in stroke rehabilitation involves physical, psychological, spiritual, economic, social, and family effort aspects (Nurrandi & Putri, 2021). Family involvement in stroke rehabilitation includes prevention of recurrence, motivation for treatment, and training independence (Israfil, 2024). Family involvement in physiotherapy home programs has a significant relationship with activity daily living in post-stroke patients (Utami et al., 2023). Family support plays a significant role in motivating post-stroke patients to engage in medical rehabilitation exercises, achieving optimal recovery levels (Susetyo, 2023).

### ***Family Role on QoL***

The findings of the statistical test indicate a positive T-statistic of 0.631, a path coefficient of 0.052, and a p-value of 0.528, which indicates the impact of family involvement on QoL. We can conclude that family roles do not significantly and favorably affect people's QoL. The research results show that family role positively influences QoL. This means that the higher the family role, the higher the quality of life. Conversely, the lower the family role, the lower the QoL. These findings are similar to the research conducted by Nisak and Rahmalia (2023), which states that there is a strong relationship between family support and the QoL of stroke patients. According to Choliq et al., (2020), the role and support of the family influence stroke patient care at home, including improvements in ADL, quality of life, cognitive function, and self-efficacy. Coordinated stroke rehabilitation facilitates post-stroke adjustments for patients and families and increases overall quality of life (Shuranova et al., 2024). Family involvement in stroke recovery helps patients feel more cared for, provides encouragement and motivation, raises their passion for life, and reduces the burden on their mind (Baihaqi et al., 2024).

### ***Speech Therapy Services on QoL Mediated by Family Role***

With a significance level of  $0.001 < 0.05$ , the statistical test findings investigate the simultaneous impact of speech therapy services on QoL through family role (X on Y through Z), reveal a path coefficient of 0.026 and a P-value of 0.001. Family role as an intervening or partial mediation variable does not have a positive and substantial impact on QoL through speech therapy services, indicating that quality of life is good even in the absence of family role as an intervening variable. This was supported by Preetha & Perumal's results which demonstrate that communication intervention is essential for individuals with aphasia to enhance their communication quality and can serve to increase awareness of its significance (Preetha & Perumal, 2022). However, through family role as an intervening variable, the relationship between speech therapy services and quality of life is not positively and significantly influenced. This proves that family role cannot act as an intervening or mediation variable between speech therapy services and quality of life at RSUD Ngudi Waluyo Wlingi. These findings are not in line with the research conducted by Sukmawati et al. (2023), which states that there is a significant influence of education about speech therapy and home care (family role) on the QoL of patients.

## **CONCLUSION**

This study looked at how speech therapy services affected stroke patients' quality of life by examining the involvement of the family. Following analysis of the data gathered from 100 respondents, a number of findings were reached. First, the standard of life of stroke survivors has been significantly improved by speech therapy treatments. Second, the function of familial relationships in patient care is also much improved by speech therapy. The participation of the family itself, however, did not significantly affect the patient's quality of life, according to the study. Additionally, speech therapy services had no discernible impact

on QoL through the family's function as an additional factor, suggesting that therapy, not family engagement, is the direct cause of patients' improved QoL. For future research, it is suggested to explore additional factors influencing stroke patients' QoL, such as social support, psychological conditions, or other health-related variables. Incorporating moderating variables may also help assess the family's role as a mediator. For speech therapy providers, ensuring high-quality services tailored to patient needs and maintaining good communication with families is essential. Lastly, patients and their families should actively participate in therapy, provide emotional support, and maintain open communication with medical teams to achieve optimal recovery outcomes.

## REFERENCES

- Astriani, N. M. D. Y., Dewi, P. I. S., Heri, M., & Widiari, N. K. E. (2019). Terapi AIUEO terhadap kemampuan berbicara (afasia motorik) pada pasien stroke. *Journal of Telenursing (JOTING)*, 1(2), 396–405.
- Baihaqi, M., Suminar, J., & Prasanti, D. (2024). Pola komunikasi anggota keluarga dengan penyandang stroke iskemik sebagai upaya pemulihan. *HUMANUS: Jurnal Sosiohumaniora Nusantara*. <https://doi.org/10.62180/185q3872>
- Bueno-Guerra, N., Provencio, M., Tarifa-Rodríguez, A., Navarro, A., Sempere-Iborra, C., Jordi, P., de Celis-Ruiz, E., Alonso de Leciñana, M., Martín-Alonso, M., Rigual, R., Ruiz-Ares, G., Rodríguez-Pardo, J., Virués-Ortega, J., & Fuentes, B. (2024). Impact of post-stroke aphasia on functional communication, quality of life, perception of health and depression: A case-control study. *European Journal of Neurology*, 31(4), e16184. <https://doi.org/10.1111/ene.16184>
- Chiamonte, R., Pavone, P., & Vecchio, M. (2020). Speech rehabilitation in dysarthria after stroke: A systematic review of the studies. *European Journal of Physical and Rehabilitation Medicine*. <https://doi.org/10.23736/S1973-9087.20.06185-7>
- Choliq, I., Nasrullah, D., & Sukadiono, S. (2020). Role of family in caring patient with post-stroke at home: A systematic review. *International Journal of Psychosocial Rehabilitation*, 24(10), 11004–11013.
- Djuhendi, H., & Popon, P. (2021). Pengaruh penerapan metode terapi komunikasi total terhadap pasien afasia global pasca stroke: Effect of application of total communication therapy method on post-stroke global aphasia clients. *Jurnal Teras Kesehatan*, 4(1), 70–83.
- Ginting, R. L., Sari, S. O., Silalahi, F. O., Cahyanti, A. D., Plentiful, A., & Tarwadi, Israfil, I. (2024). The role of family in stroke patients in the community: A narrative review. *Ahmar Metastasis Health Journal*. <https://doi.org/10.53770/amhj.v4i3.412>
- Larweh, G., Owusu Antwi, A. A., Owusu, E. A., & Tagoe, T. A. (2025). Exploring benefits of speech and language therapy interventions for post-stroke aphasia rehabilitation: A qualitative study. *Heliyon*, 11(3), e41373. <https://doi.org/10.1016/j.heliyon.2024.e41373>
- Lindsay, M. P., Norrving, B., Sacco, R. L., Brainin, M., Hacke, W., Martins, S., & Feigin, V. (2019). World Stroke Organization (WSO): Global Stroke Fact Sheet 2019.
- Nisak, R., & Rahmalia, M. J. (2023). Dukungan keluarga berhubungan dengan kualitas hidup penderita stroke: Family support related to quality of life for stroke patients. *Jurnal Ilmiah Keperawatan (Scientific Journal of Nursing)*, 9(2), 252–259.
- Nurrandi, S., & Putri, T. (2021). Family experience as caregivers in the rehabilitation of stroke patients: A literature review. *KnE Life Sciences*, 736–744. <https://doi.org/10.18502/KLS.V6I1.8749>
- Preetha, U. M., & Perumal, R. C. (2022). Quality of communication life (QoCL) in persons with expressive aphasia with and without communication intervention: A comparative study. *Neurology India*, 70(3), 1125–1130. <https://doi.org/10.4103/0028-3886.349635>

- Recabarren, R. E., Gaillard, C., Guillod, M., & Martin-Soelch, C. (2019). Short-term effects of a multidimensional stress prevention program on quality of life, well-being and psychological resources: A randomized controlled trial. *Frontiers in Psychiatry*, 10, 414151.
- Rezaeipandari, H., Morowatisharifabad, M. A., Mohammadpoorasl, A., & Shaghghi, A. (2020). Cross-cultural adaptation and psychometric validation of the World Health Organization Quality of Life-Old Module (WHOQOL-OLD) for Persian-speaking populations. *Health and Quality of Life Outcomes*, 18(1), 67.
- Riskesdas. (2018). Laporan Nasional 2018 Badan Penelitian dan Pengembangan Kesehatan Departemen Kesehatan.
- Roberts, S., Bruce, R., Lim, L., Woodgate, H., Ledingham, K., Anderson, S., Lorca-Puls, D., Gajardo-Vidal, A., Leff, A., Hope, T., Green, D., Crinion, J., & Price, C. (2021). Better long-term speech outcomes in stroke survivors who received early clinical speech and language therapy: What's driving recovery? *Neuropsychological Rehabilitation*, 32, 2319–2341. <https://doi.org/10.1080/09602011.2021.1944883>
- Siregar, R. L. (2021). Memahami tentang model, strategi, metode, pendekatan, teknik, dan taktik. *Hikmah: Jurnal Pendidikan Islam*, 10(1), 63–75.
- Shuranova, L., Vacková, J., Rimárová, K., Míková, M., Motlová, L., Švestková, R., Baloun, I., & Faltová, B. (2024). Life after stroke and the key role of coordinated rehabilitation from the perspective of the stroke survivor families. *Clinical and Preventive Medicine*. <https://doi.org/10.31612/2616-4868.6.2024.06>
- Sukmawati, S., Mamuroh, L., & Nurhakim, F. (2024). Peningkatan kualitas hidup pasien stroke melalui edukasi terapi wicara dan stroke home care. *GUYUB: Journal of Community Engagement*, 5(2), 466–479.
- Susetyo, R. (2023). Literatur review peran dukungan keluarga pada pasien pasca stroke dalam latihan rehabilitasi medik. *Detector: Jurnal Inovasi Riset Ilmu Kesehatan*. <https://doi.org/10.55606/detector.v1i4.2538>
- Utami, K., Fauziyah, A., & Rahim, A. (2023). The relationship between family involvement in physiotherapy home programs and activity daily living in post-stroke patients. *KnE Medicine*. <https://doi.org/10.18502/kme.v3i2.13045>
- Yulianto, G., Utami, I. T., & Inayati, A. (2021). Efektifitas terapi "AIUEO" terhadap kemampuan berbicara pasien stroke non hemoragik dengan afasia motorik di Kota Metro. *Jurnal Cendikia Muda*, 1(3), 339–343.
- Yuniarti, I. I., & Kariasa, I. M. (2020). Peran keluarga terhadap self-management pasien pasca stroke: Literature review. *Dunia Keperawatan: Jurnal Keperawatan dan Kesehatan*, 8(3), 452–459.
- Zumbansen, A., Kneifel, H., Lazzouni, L., Ophay, A., Black, S., Chen, J., Edwards, D., et al. (2022). Differential effects of speech and language therapy and rTMS in chronic versus subacute post-stroke aphasia: Results of the NORTHSTAR-CA trial. *Neurorehabilitation and Neural Repair*, 36, 306–316. <https://doi.org/10.1177/15459683211065448>.