



## Original Research

## Effectiveness of a Therapeutic Education Program on Knowledge, Compliance, and Quality of Life Among Stroke Patients in Libreville

*Efficacité d'un Programme d'Éducation Thérapeutique sur les Connaissances, l'Observance et la Qualité de Vie des Patients Victimes d'un AVC à Libreville*

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## ABSTRACT

**Introduction.** Stroke is the second leading cause of disability-adjusted life years worldwide and the first cause of acquired adult disability. In Gabon, data on post-stroke therapeutic education remain scarce. This randomized trial aimed to evaluate the effect of a therapeutic education program on treatment adherence and quality of life in stroke survivors in Libreville. **Methods.** We conducted a single-blind, parallel-group, randomized controlled trial from July to September 2023 in the Neurology Department of Libreville University Hospital. We included adults aged  $\geq 21$  years with imaging-confirmed stroke, no cognitive impairment (CSI-D  $> 7$ ), and written informed consent. The intervention group received four weeks of therapeutic education sessions; the control group received usual care. Adherence was measured by the Girerd score, quality of life by the WHOQOL-Bref (four domains). Analysis used Student's t-test or Mann-Whitney U test (R 4.1.1). **Results.** Of 210 screened patients, 36 were randomized (18 per group). Mean age was  $55.7 \pm 10.8$  years (intervention) vs  $55.8 \pm 13.7$  years (control,  $p=0.968$ ). Baseline imbalances existed: dyslipidemia (22.2% vs 0%), prior stroke (38.9% vs 5.6%), mood disorders (5.6% vs 61.1%). Median NIHSS was 3.2 (IQR 1-5) vs 4.5 (IQR 3-7,  $p=0.289$ ). Therapeutic adherence did not differ between groups: good adherence 5.6% in both ( $p=0.927$ ). Quality-of-life domain scores were higher in the intervention group but not significantly (domain 1: 14.5 vs 13.1,  $p=0.134$ ; domain 2: 14.8 vs 13.3,  $p=0.149$ ; domain 3: 13.6 vs 11.9,  $p=0.108$ ; domain 4: 12.0 vs 11.1,  $p=0.238$ ). Knowledge of stroke definition, risk factors, and warning signs was significantly better in the intervention group (e.g., 77.8% vs 11.1% for definition). **Conclusion.** A four-week therapeutic education program improved stroke knowledge but did not significantly increase treatment adherence or quality of life in this small trial. Larger studies are needed to assess clinical benefits.

## RÉSUMÉ

**Introduction.** Au Gabon, l'éducation thérapeutique après un accident vasculaire cérébral (AVC) est peu évaluée. Cet essai randomisé visait à mesurer son effet sur l'observance et la qualité de vie des patients AVC à Libreville. **Méthodes.** Nous avons mené un essai contrôlé randomisé en simple aveugle (juillet-septembre 2023, CHU de Libreville). Adultes  $\geq 21$  ans, AVC confirmé par imagerie, sans trouble cognitif (CSI-D  $> 7$ ). Le groupe intervention a reçu quatre semaines d'éducation thérapeutique (séances collectives sur la physiopathologie, facteurs de risque, signes d'alerte, observance) ; le groupe témoin a reçu les soins habituels. L'observance a été mesurée par le score de Girerd, la qualité de vie par le WHOQOL-Bref (quatre domaines). Analyse par test t ou Mann-Whitney (R 4.1.1). **Résultats.** Sur 210 patients dépistés, 36 ont été randomisés (18 par groupe). L'âge moyen était de  $55,7 \pm 10,8$  ans (intervention) contre  $55,8 \pm 13,7$  ans (témoin,  $p=0,968$ ). Des déséquilibres initiaux existaient : dyslipidémie (22,2 % vs 0 %), antécédent d'AVC (38,9 % vs 5,6 %), troubles de l'humeur (5,6 % vs 61,1 %). Le NIHSS médian était de 3,2 vs 4,5 ( $p=0,289$ ). La bonne observance n'était que de 5,6 % dans les deux groupes ( $p=0,927$ ). Les scores de qualité de vie étaient plus élevés dans le groupe intervention sans différence significative (domaine physique : 14,5 vs 13,1,  $p=0,134$  ; psychologique : 14,8 vs 13,3,  $p=0,149$  ; relations sociales : 13,6 vs 11,9,  $p=0,108$  ; environnement : 12,0 vs 11,1,  $p=0,238$ ). Les connaissances sur l'AVC étaient nettement meilleures dans le groupe intervention (définition : 77,8 % vs 11,1 % ; facteurs de risque : 83,3 % vs 0 %). **Conclusion.** Un programme court d'éducation thérapeutique améliore les connaissances mais n'augmente ni l'observance ni la qualité de vie dans cet essai pilote. Des études de plus grande puissance, avec suivi prolongé et prise en compte des troubles de l'humeur, sont nécessaires.

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**HIGHLIGHTS FOR READERS IN A HURRY**

**What is already known on this topic.** Therapeutic education improves knowledge and self-management in chronic diseases such as diabetes and hypertension. In stroke, small studies suggest possible benefits on adherence and quality of life, but robust evidence from sub-Saharan Africa is lacking.

**The question this study addressed.** Does a four-week therapeutic education program improve treatment adherence and quality of life in stroke patients followed at the Libreville University Hospital, compared with usual care?

**What the study adds to our knowledge.** In this pilot randomized trial of 36 patients, the intervention significantly increased stroke knowledge (definition: 77.8% vs 11.1%; risk factors: 83.3% vs 0%). However, good treatment adherence was only 5.6% in both groups ( $p=0.927$ ). Quality-of-life domain scores were higher in the intervention group but not statistically significant ( $p$  values from 0.108 to 0.238). Baseline imbalances (dyslipidemia, prior stroke, mood disorders) limit comparability.

**How this is relevant to clinical practice, policy or further research.** Therapeutic education alone, without addressing concomitant mood disorders or social barriers, may be insufficient to change adherence or quality of life. Clinicians should screen for depression and tailor support. Future large, adequately powered trials with longer follow-up and balanced groups are needed before recommending widespread implementation.

**INTRODUCTION**

Strokes are defined as the rapid development of localized or global clinical signs of cerebral dysfunction with symptoms lasting more than 24 hours that may lead to death, with no apparent cause other than a vascular origin [1]. They have been on the rise in African countries over the past two decades [2]. Epidemiological indicators point to a significant disease burden, which is considered a health priority [3]. In developed countries, stroke is the second leading cause of DALYs (disability-adjusted life years) after myocardial infarction. However, the loss of DALYs in developing countries is seven times higher than in developed countries [4]. Sub-Saharan Africa pays a heavy price, particularly with a population dominated by young adults. In Gabon, data from recent studies corroborate these observations. The prevalence of stroke is on the rise, and the proportion of the young population affected is significant. The prevalence of stroke among young people was already 21.6% in Libreville in 2021 [5]. The challenge in managing this condition is to integrate tools such as therapeutic education (TPE) into the healthcare system, which would enable this young population in particular to better understand the disability caused by the disease. Parameters such as compliance appear to be essential and are at the heart of the health issue. In the case of chronic diseases, therapeutic compliance does not exceed 50% [6]. The main obstacles encountered by patients are related to difficulties in adapting to a new life, a deterioration in self-image, and questions about their place in society. Therapeutic education has been developing continuously for more than 30 years to improve the care of chronic patients [7]. Its

aim is to train patients to achieve a balance between their life and optimal control of their disease by acquiring self-care and adaptation skills [8]. In the specific case of stroke, the goal for patients involved in TPE is to learn how to better manage neurovascular risk and the resulting sequelae, particularly in terms of adapting their environment to their disability and improving their functional abilities [8].

To date, no studies have been conducted on the use of TPE in the care of stroke patients in Libreville to assess its effect on their quality of life. This research therefore aims to evaluate the effectiveness of a TPE program on treatment compliance and quality of life in stroke patients.

**PATIENTS AND METHODS**

This was a preliminary experimental study, a randomized controlled clinical trial with a single-blind design comparing two parallel groups, aimed at evaluating the effectiveness of a therapeutic education program on treatment compliance and quality of life in stroke patients.

The study population consisted of stroke patients who had been hospitalized in the Neurology Department of the Libreville University Hospital for at least three months. The study was conducted between July 1, 2023, and September 30, 2023. Patients of both sexes aged 21 years and older who had suffered a stroke confirmed by brain imaging, had no cognitive impairment ( $CSI-D > 7$ ), and had given their free and informed written consent were included. All patients who did not attend any therapeutic education sessions or who developed cognitive impairment during the study period were excluded. The primary outcome measures were treatment adherence and compliance, which were assessed using the GIRERD questionnaire, and quality of life, which was assessed using the WHOQOL-bref scale. This scale has four domains relating to physical health, psychological health, social relationships, and the environment, respectively.

Each participant was assessed by the same evaluator at the beginning and end of the intervention after the therapeutic education sessions. The assessments were carried out under the same conditions for all subjects at the hospital during a consultation during which the patient could be accompanied by a caregiver if they wished. The questionnaire was digitized on the KoboToolbox platform. Data analysis was performed using R 4.1.1 software. For the comparison of means, Student's t-test was used when the distribution of the quantitative variable followed the normal distribution in the groups (ETP+ and ETP-). When the distributions did not follow a normal distribution, the non-parametric Mann-Whitney test was used to test the association between the quantitative variable and the FTE. The difference in comparisons was considered significant for values of  $p < 0.05$ . The protocol for this study strictly adhered to the principles of medical research, such as confidentiality and the free consent of volunteers. The volunteers signed an informed consent form after clear and precise explanations of the objectives and benefits of the study had been provided to each participant in an information form.

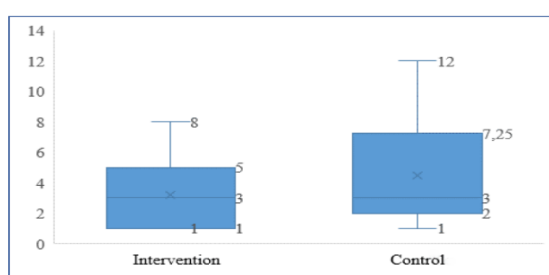
## RESULTS

During the study period, 210 stroke patients were registered. Based on a review of the files, 28 patients with Wernicke's aphasia-type language disorders were excluded. The remaining patients were contacted, and 70 of them responded to the call. Of the 70 patients who could be reached, 38 were enrolled. Two patients were excluded due to cognitive disorders diagnosed as d by the CSID score. A randomization plan in blocks of four (04) was used to randomly assign patients to one of the two arms of the trial, either the intervention group, which received TPE, or the control group, which did not receive TPE. According to the experimental design, patients received TPE sessions for four weeks. Both groups were then recalled to complete the survey questionnaire.

The average age of patients was  $55.7 \pm 10.8$  years in the TPE+ group and  $55.8 \pm 13.7$  years in the non-TPE- group ( $p=0.968$ ). There was no significant difference between the two groups in terms of sociodemographic characteristics. There was a significant difference between the two groups in terms of history of dyslipidemia, stroke, and mood disorders. It was observed that 22.2% and 38.9% of patients who received ETP+ had dyslipidemia or a history of stroke, compared with 0% and 5.6% in the control group (ETP-).

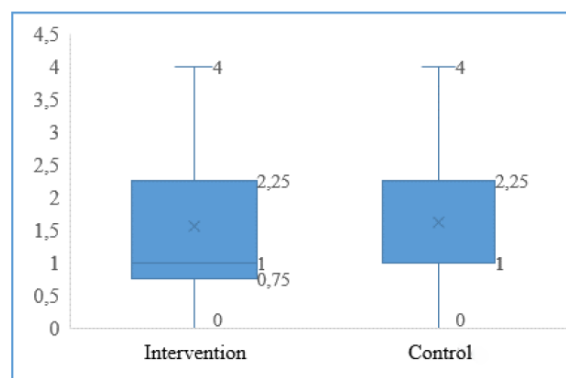
In addition, 61.1% of patients in the ETP- group had mood disorders, compared with 5.6% of patients in the ETP+ group. The two groups were comparable in terms of other medical histories, such as a history of hypertension, diabetes, motor deficits, sensory disorders, or language disorders.

Overall, the NIHSS score ranged from 1 to 12 with a median of 3. Analysis by group showed that the median stroke severity score was 4.5, interquartile range (IQR) = 3-7 in the non-ETP+ group and 3.2 (IQR = 1-5) in the intervention group. However, there was no significant difference ( $p=0.289$ ) between the two groups in terms of stroke severity, as shown in Figure 1.



**Figure 1 :** Distribution of NIHSS scores in both groups, Randomized Clinical Trial, Libreville 2023

The modified Rankin score (mRS) ranged from 0 to 4 in both groups, with an almost identical median value in both groups, either, 1.5 in patients who received ETP+ and 1.6 in the control group ( $p=0.855$ ), as shown in the box plot below.



**Figure 2 :** Distribution of the modified Rankin score (mRS) in both groups, Randomized Clinical Trial, Libreville 2023

There was a significant difference between the two groups in terms of their knowledge of stroke, its risk factors, and warning signs after the health education program. Regarding the definition of stroke, 77.8% had good knowledge in the group of patients who benefited from the health education program, compared to 11.1% in the control group. With regard to cardiovascular RFs, 83.3% had good knowledge in the intervention group. In contrast, no patients in the control group were aware of these cardiovascular RFs. With regard to warning signs, overall, all patients who received ETP were able to cite motor or sensory deficits, speech disorders, or balance disorders as warning signs. In contrast, in the non-HTS group, 72.2%, 27.8%, and 5.6% were able to cite these warning signs of stroke, respectively. The same trend was also observed with regard to sudden headaches as a warning sign of stroke.

Therapeutic compliance was not significantly different between the two groups ( $p=0.927$ ). The level of good compliance was identical in both groups (5.6%) as described in Table I.

	Total		Intervention		Control		P
	Number	(%)	Number	(%)	Number	(%)	
<b>Non-adherence</b>	9	(25,0)	5	(27,8)	4	(22,2)	<b>0,927</b>
<b>Poor adherence</b>	25	(69,4)	12	(66,7)	13	(72,2)	
<b>Good adherence</b>	2	(5,6)	1	(5,6)	1	(5,6)	
<b>Total</b>	<b>36</b>	<b>(100,0)</b>	<b>18</b>	<b>(100,0)</b>	<b>18</b>	<b>(100,0)</b>	

\* Intervention = Therapeutic education ; Control = No therapeutic education

### Assessment of quality of life by domain

Overall, there was no significant difference between patients' quality of life scores regardless of the domain concerned. Table II presents a description of patients' quality of life scores by domain of life and TPE. Mean quality of life scores were higher in the group that received TPE compared to the TPE- group.

**Table II : Patients' quality of life by domain according to intervention and control group, randomized clinical trial, Libreville 2023**

	Intervention (N=18)				Control (N=18)				p
	$\mu$	$\sigma$	Min	Max	$\mu$	$\sigma$	Min	Max	
<b>Domain 1</b>	14.5	2.1	10.9	18.3	13.1	3.3	8.6	18.3	0.134
<b>Domain 2</b>	14.8	2.4	7.2	18.4	13.3	3.8	4.8	18.4	0.149
<b>Domain 3</b>	13.6	2.4	8.0	16.0	11.9	3.4	4.0	16.0	0.108
<b>Domain 4</b>	12.0	2.2	7.5	14.5	11.1	2.5	7.0	14.5	0.238

### DISCUSSION

In terms of the general characteristics of the population, the average age of the study population in both the intervention and control groups was close to 60. Nyangui *et al.* made the same observation in a study conducted on strokes in Libreville in 2022 [9]. Stroke is the leading cause of acquired disability and is a condition mainly observed in older people ; in fact, 75% of stroke patients are over 65 years of age [10]. However, data from recent studies reveal that young people are less spared and, with the growth of traditional risk factors, the frequency of stroke in this population is reaching worrying proportions [11].

There was a significant difference in overall knowledge of stroke between the intervention group and the control group. Regarding the definition of stroke, 77.8% had good knowledge in the ETP+ patient group compared to 11.1% in the control group. Similarly, with regard to cardiovascular risk factors, 83.3% of patients in the ETP+ group had a good knowledge of these factors. In contrast, no patients in the ETP- group were aware of these cardiovascular risk factors. These results corroborate the data in the literature. The effectiveness of therapeutic education is clearly demonstrated in the majority of studies, regardless of the pathologies and indicators used [7]. Indeed, a 2009 Cochrane review showed that providing information to patients significantly improves their knowledge of the disease. Patients who received "active" therapeutic education were more satisfied with the knowledge they gained about the causes and nature of the cerebrovascular accident than those who received "passive" information, and they had fewer symptoms of depression or anxiety [12]. The results of this study are consistent with this finding. In fact, the proportion of patients with definite symptoms of anxiety or depression was 38.9% in the control group compared to 5.6% in the TPE+ group. TPE is essential in the management of stroke and other cardiovascular diseases because it improves knowledge of the disease, adherence to treatment, and secondary prevention outcomes [13].

The problems with "measuring compliance" stem from the fact that compliance is a difficult parameter to assess. It is accepted that the "gold standard" for assessing compliance uses electronic pillbox methods that record the number and times of doses taken [14]. In this study, the GIRERD self-assessment scale was used to measure treatment adherence, suggesting a high degree of subjectivity.

Previous studies have confirmed that 67% of patients overestimate their adherence using self-assessment measures and that women are statistically more adherent than men [15]. Informing patients and their families about their disease (pathophysiology, risk factors, clinical signs of recurrence, what to do in case of recurrence) and its treatments (including expected benefits and side effects), combined with regular multidisciplinary medical follow-up, is crucial for good therapeutic compliance. This concern for patient information is compounded by the problem of differing priorities between healthcare providers and patients. Patients are more interested in their prognosis and rehabilitation options, while doctors are more interested in correcting risk factors and providing advice on lifestyle. Therapeutic education should begin in the hospital but continue on an outpatient basis and, if possible, be provided by the same people [16]. This study did not show any additional effectiveness of a therapeutic education intervention on the quality of life of stroke patients, despite improved knowledge of the signs of the disease. However, it is possible that this intervention may benefit a subgroup of patients with severe stroke and a high NIHSS score. It is likely that this lack of effect is due to "contamination" of the intervention group by sociocultural considerations. The cultural realities and expressions found in "high-context" societies generally end up shaping behaviors that are often unconsciously maintained by the population [17]. However, the relatively short duration of the intervention probably did not allow the intervention group to assimilate the information and apply it to their condition. Living with a disability is a challenge faced by stroke survivors. Family, community, and social reintegration, as well as maintaining the level of recovery, are of paramount importance in achieving a good quality of life. In the trial, the NIHSS and Rankin scales revealed that the overall level of disability was moderate. Studies on quality of life are important for assessing the impact of an individual's life on society. These studies conducted with stroke patients have shown that stroke affects various areas of quality of life, compromising functionality [18]. Quality of life is defined by the WHO as "an individual's perception of their place in existence, in the context of the culture and value system in which they live, in relation to their goals, expectations, standards, and concerns" [19]. Ossou-Nguet *et al.* [20] in Brazzaville and Gnonlonfoun *et al.* [21] in Cotonou demonstrated in their respective series that, depending on the level and type of deficit,

patients' quality of life could be impaired. In fact, post-stroke aphasic patients in these studies had a fairly preserved quality of life for certain everyday tasks, an average quality of life for their occupation at home, relationships with loved ones, and leisure activities. The main obstacles encountered by patients were related to difficulties in adapting to a new life after leaving hospital, a deterioration in self-image and self-nd questions about their place in society. The HADs score assessed in both groups showed that 83.3% of participants in the group that had received TPE had no symptoms of anxiety or depression (0-7), compared to 50% in the control group. Therapeutic education can therefore be credited with improving the image of stroke patients in our context.

### LIMITATIONS

The aim of this study was to evaluate the effectiveness of a therapeutic education program in a population of stroke patients in terms of improving quality of life and therapeutic compliance compared to a control group that did not receive education. Although the comparability of the two groups was confirmed by the absence of significant differences in sociodemographic parameters such as age and gender, and although all participants came from the same basic environment, represented here by the neurology department of the Libreville University Hospital, the effect of the therapeutic education program was not conclusively assessed because there was no significant difference in the variables of interest in the different groups studied. The small sample size, which reduced the power of the study, could explain these results. In addition, confounding biases regarding the attributable variation in the outcome measures in the groups remain uncertain because multivariate analysis was not performed in this study. This research, conducted as a randomized controlled trial, evaluated the effectiveness of a therapeutic education program on an intervention group and a control group. In general, the specific goals of therapeutic education are to help patients acquire and maintain the skills they need to best manage their lives during a stroke [22]. However, achieving these goals depends on certain parameters.

### CONCLUSION

Recent randomized studies have demonstrated the effectiveness of TPE after a stroke by showing an improvement in knowledge about the pathology and in the perception of patients' health status. Thus, the implementation of a TPE program in neurology appears to be an essential step in the treatment and follow-up of stroke patients. Therapeutic education in stroke management has already proven its worth in terms of knowledge. Its impact on compliance and quality of life remains to be confirmed in stroke patients in Libreville, as the results obtained in this study did not demonstrate that this approach improved compliance and quality of life in patients living with stroke. However, this preliminary study could serve as a springboard for a controlled trial involving a larger number of patients to increase its power. Modern medicine is facing major upheavals in the treatment of chronic patients, who now account for the vast majority of consultations. New practices are being

implemented and caregivers are developing psycho-educational skills, as these diseases require significant behavioral changes in patients. Practitioners are becoming caregiver-educators in a relationship that aims to be respectful of the individual, leading to a more humanistic approach to medicine. Therapeutic education offers ways to support these individuals, who can then learn and change to improve their health.

### DECLARATIONS

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#### Conflicts of interest

The authors declare no conflict of interest.

#### Funding

The work was carried out with own funds.

#### Ethical considerations

All stages of the work were carried out in compliance with the Declaration of Helsinki. The approval of the institutional ethics committee was obtained prior to the start of the study. This work did not involve any experimentation on humans or animals and it does not contain any personal information that could identify the patients

#### Data availability

Data is available on reasonable request from the principal author.

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