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Documenting psychosocial attitudes of persons with aphasia following semantic-based therapy: an exploratory study

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Abstract: Quality of life (QOL) for individuals with aphasia is very individualistic and subjective as the condition presents multifaceted impairments in communication skills. Most intervention strategies for persons with aphasia (PWA) emphasise improving communication and insignificantly focus on a person's social and emotional well-being, which are vital for effective social communication. The present study aims to analyse the effects of a semantic-based treatment approach on the QOL of PWA. The current study inculcated a "modified pre-test post-test design" to study the impact of semantic cueing for verbs and its thematic role (SCVTr) therapy among eleven Kannada-speaking PWAs. The Stroke and Aphasia Quality of Life-39 (SAQOL-39) Kannada version assessed QOL among PWAs. SAQOL-39 includes 39 physical, psychosocial, communication, and energy questions. The questionnaire was administered in pre-, mid-, post-, and follow-up phases after SCVTr therapy. The study deployed qualitative, quantitative, and visual inspection methods. The qualitative and quantitative scores for QOL measures showed pronounced effects among most participants across pre- to mid- to post-treatment phases. In addition, the results of maintenance of the QOL were observed among most participants post-SCVTr therapy. The uptrend in QOL among PWAs is attributed to the semantic activation enhanced through SCVTr protocol, near normal physical mobility, adequate social network, and family support, with a barrier-free environment. The study's findings pave the way for speech-language pathologists (SLPs) on the importance of aphasia intervention and its effect on QOL. Indeed, SLPs must observe every PWA beyond linguistic deficits and attempt to notice the psychosocial level, which may invariably vary with severity and other individualistic factors.

Keywords: Semantic treatment; Word retrieval treatment; Cerebrovascular accident; Stroke survivors; Anomia

1.0 INTRODUCTION

Quality of life (QOL) is elucidated as an individual's perception of their position in life in the context of the culture and value systems in which they live and about their goals, expectations, standards and concerns (World Health Organisation, 1997). In other words, QOL refers to individual well-being in their lives. It is a subjective phenomenon, as it differs across individuals.

The discreteness in QOL is based on personal physical health, psychological state, social relationship, and level of autonomy (Hilari et al., 2012). Literature on QOL has shown a negative correlation between QOL and stroke survivors. These radical negative changes in QOL are not likely dependent on age or sex but rather depend on the level of depression and slower reacquisition of motor abilities in stroke survivors (Ones et al., 2005).

The breadth of understanding and the necessity to consider QOL in health care has received significant interest recently. The inclusion of QOL in the health sector owes to an increase in the Patient-Reported Outcome Measures (PROMs) movement. PROMs entail QOL and Health-Related Quality of Life (HRQOL). In addition, PROMs consider specific aspects of QOL, such as emotional stability, social relationships, and life satisfaction. This movement aids clinicians and researchers to have a deeper insight into the client's life and inculcates the client's perception in the clinical decision (Patrick & Erickson, 1993; Mayou & Bryant, 1993). In recent scenarios, there is an urge to use PROMs, which remains one of the primary goals of any intervention approach.

1.1 Quality of Life in Aphasia

Morrow-Odom et al. (2017) conducted a study to understand the insight of speech-language pathologists (SLPs) on the following: (1) the importance of QOL assessment in persons with aphasia (PWAs); (2) current trends and practices in regular day-to-day clinical practices; and (3) possible challenges faced during the assessment of QOL.

Results of the study showed that most of the SLPs upheld the importance of assessment of QOL in PWAs. Most of the QOL assessments were carried out via interviews and observation. Interestingly, most SLPs reported significant challenges faced during QOL assessment are training/knowledge about QOL and paucity of resources on QOL assessment, especially to assess severe forms of aphasia. Overall, the study upheld the view of QOL assessment throughout the rehabilitation process to facilitate robust recovery in PWAs.

Preetha and Perumal (2022) investigated understanding the relationship between intervention and QOL. They recruited 20 PWAs (non-fluent variant). These participants were further divided into two groups. Group 1 received at least three months of intervention, and Group 2 received no formal intervention. The study results showed robustness in quality of life in Group 1 compared to Group 2. This signifies that intervention and quality of life are positively correlated.

A population-based study was carried out to ascertain the impact of QOL on various diseases such as aphasia, cancer, and so on. The findings of the study showed that individuals manifesting aphasia have the most considerable negative impact on QOL compared to other diseases, such as cancer and Alzheimer's (Lam & Wodchis, 2010). Similarly, Hilari and Cruice (2013) conducted a systematic review to gain insight into variables that affect QOL in PWAs. The study findings posited that QOL is negatively affected due to the severity of aphasia, emotional distress, activity limitations, poor social networks, and other medical problems.

Qualitative studies have been carried out to elucidate the overarching themes that bring positive changes in PWAs. These themes were meaningful relationships, participation, support, positivity, independence, and autonomy. The abovementioned themes mediated PWAs to have better QOL (Brown et al., 2011). The study findings seem to be an eye-opener for many researchers and clinicians who work with PWAs.

In general, aphasia intervention focuses on promoting linguistic functions. However, promoting social networks and emotional well-being also plays a pivotal role in bringing holistic improvement in PWAs. It is also vital to gauge the influence of treatment paradigms on PWA's QOL. If the QOL of PWAs were influenced, then it would be interesting to note what kind of treatment protocol aids in evincing positive effects in QOL.

1.2 Effect of Intervention on Quality of Life

Rangamani and Judovsky (2020) conducted a study to tease the effectiveness of two commonly used QOL assessment tools. In addition, the study intended to capture the effect of aphasia-related factors on QOL. Twenty-one PWAs were recruited with post-stroke onset, two months to 14 years post-stroke individuals. The study results posited that the ASHA Quality of Communication Life Scale (ASHA-QCL) was better than the ASHA-Functional Assessment of Communication Skills (ASHA-FACS).

In addition, Rangamani and Judovsky (2020) discerned that QOL did not vary across different post-stroke onset periods. QOL was equally affected in both mild and moderate-severe variants of aphasia. QOL has negatively affected PWAs who exhibited cognitive deficits compared to PWAs with no cognitive

impairment. QOL was also compared across the amount of therapy PWAs received.

Interestingly, it was found that QOL was better in PWAs who received less than 100 hours of therapy compared to PWAs who received more than 100 hours of therapy. This finding was attributed to the less severe language deficit group who received less than 100 hours of therapy, and hence, QOL was better evinced in them. Briefly, this study highlighted the importance of QOL assessment in therapy. Authors try to elucidate the possible confounding variables, which SLPs should be aware of while assessing QOL.

Van der Gaag et al. (2005) assessed if aphasia therapy changed participants' perceptions about their communication and QOL. The study recruited 28 PWAs who received socially-oriented group therapy for about 1.7 hours a week for 20 weeks. In addition, PWAs also received eight hours of counselling. The study's findings showed a significant positive change in QOL and communication through rating scales. Despite the positive findings noted in the study, the results should be interpreted with caution, owing to the rater bias.

Studies report that the intervention approaches for PWAs facilitate maximal generalisation and show positive QOL owing to improved communication across different contexts. This enables better motivation and interest in communicating in PWAs (Edmonds & Babb, 2011; Edmonds et al., 2014).

There are discrete intervention approaches designed to remediate impairment associated with PWAs. Semantic-based therapies stand out from the discrete intervention approaches, owing to their robust outcome noted in the previous studies (Boyle, 2004; Coelho et al., 2000; Edmonds et al., 2009). Semantic-based therapy aids in facilitating words beyond the trained conditions. This enables PWAs to have maximal generalisation skills.

Under the domain of semantic-based therapy, there are approaches such as Semantic Feature Analysis (Boyle & Coelho, 1995), Verb Network Strengthening Treatment (VNeST) (Edmonds et al., 2009), and Semantic Cueing of Verb and its Thematic role (SCVTr) (Deepak & Goswami, 2020). Of the various semantic therapies, the present article elucidates exclusively the effect of SCVTr therapy on PWAs.

The SCVTr therapy utilises verbs as a core element in the training, and generally, verbs are predicative components, and nouns are adjectival components. For example, the words 'cat' and 'whining, drinking, and running' are the predicative components. Likewise, 'tail, coloured eyes, and small domestic' can be the adjectival components. Furthermore, verbs are pivotal in sentence formation because they carry a critical meaning. Researchers have argued that when a verb is heard/read, it activates generalised situation knowledge (Deepak & Goswami, 2020). Thus enabling participants to activate the corresponding thematic roles.

Studies have noted positive gains in functional communication, connected speech, and discourse genre with verb-based therapies. Verbs comprise semantic and syntactic information, which are essential for sentence construction. For instance, if PWAs exhibit alleviated performance in retrieving verbs, one manifests impairment in constructing sentences per se (Berndt et al., 1997). Hence, targeting verbs in therapy is pivotal in maximising generalisation skills. This, in turn, increases PWAs' confidence and motivation for communication.

Aphasia is deemed to be a chronic condition with an invisible communication disorder. This condition can affect individuals' various dimensions of communication, thus creating significant barriers for PWAs. Communication skills serve to be the fundamental skill one needs to have for effective expression, creating self-identity, building and maintaining relationships, and managing emotional well-being (Simmons-Mackie et al., 2014). Furthermore, following stroke, PWAs exhibit difficulties in communication in day-to-day situations, social networking, vocational limitations, and difficulty in accessing information and transportation. These factors significantly contribute to alleviating the QOL in PWAs (Ross & Wertz, 2003). Hence, observing the linear relationship between communication and QOL, it is paramount to consider assessing QOL at the start, during the intervention, and at the follow-up phase.

Kirkevold (2002) conducted a study that aimed to identify the challenges faced by stroke survivors at different points after a stroke. The researcher asserted that stroke survivors pose difficulty in accepting the new reality of living with a permanent disability. Ch'ng et al. (2008) reported engagement in new roles, acceptance of changes due to stroke, and the lack of social support to be key aspects considered during the post-stroke period. These aforementioned study results signify that stroke survivors manifest poor QOL following a stroke.

Owing to poor QOL, psychosocial assessment/ management and linguistic treatment are key elements in the long-term recovery of communication skills in PWAs.

In the recent decade, intervention approaches developed to maximise the communication effectiveness among PWAs have noted and elucidated the importance of gauging functional communication skills. However, the QOL or functional skill measurement assessment is not documented via formal assessment tools.

Recently, there has been an urge to inculcate client-centred and evidence-based approaches in the rehabilitation of PWAs. Furthermore, it is pivotal to consider the impact of therapy on the life of PWAs from their perspective (Best et al., 2008). In general, Speech Language Pathologist's (SLP) goal is to enhance individuals' communication skills and/or swallowing in natural environments (Coordinating Committee of the Vice President for Speech-Language Pathology Practice, 2009). This goal can be accomplished through evaluations and interventions of functionally relevant events in regular day-to-day clinical practice. Speech-language pathologists (SLPs) significantly remediate linguistic impairment and ameliorate the QOL in PWAs.

Hence, the key goal of aphasia rehabilitation should not be restricted to assessing and treating the linguistic deficits of PWAs. Instead, it should focus on monitoring the effect of therapy on quality of life. Despite understanding the salience of QOL in aphasia rehabilitation, there is a shortfall of studies that document the transformations in QOL after aphasia rehabilitation. Thus, the current study aimed to document the effect of semantic-based treatment on QOL.

1.3 Objectives of the study

First, to investigate the effect of semantic-based treatment on QOL in PWAs across pre-, mid-, and post-treatment phases. Second, to investigate the maintenance effect of QOL in PWAs after one month of cessation of treatment.

2.0 METHODS

The current study inculcated a "modified pre-test post-test design" to study the impact of semantic-based therapy in Kannada-speaking PWAs. This design was chosen because the assessments were done multiple times (pre-, mid-, post-, and follow-up phases). Semantic Cueing Verbs and its Thematic Roles (SCVTr) therapy was rendered to all the eleven PWAs in the study for a minimum of 10 to 20 sessions. Every PWA received therapy at least three days a week that lasted 45 minutes daily. The therapy outcome was measured in pre-, mid-, post-, and follow-up phases. After SCVTr therapy, QOL was gauged at the fixed timelines as aforementioned.

2.1 Participants

In the present study, eleven Kannada-speaking (Regional language spoken in Karnataka state, India) PWAs were recruited via purposive sampling. PWAs recruited for the study were diagnosed with fluent and non-fluent aphasia (See **Table 1** for detailed demographic details). All participants' details are maintained with utmost confidentiality and privacy. The sample size selected for the study was ensured using G* power software version 3.1 with α, 1-β levels at 0.05 and 0.95, respectively, at effect size 0.5 (Faul et al., 2009). The analysis prescribed a sample size ranging from three to ten participants. The participants chosen for the study were from and around the Mysuru district (Karnataka state, India).

The participants selected for the study met the following inclusion and exclusion criteria. (a) PWAs had left hemisphere cerebrovascular accident (CVA) with a minimum of three months of stroke post-onset (SPO); (b) All had a minimum of 50% scores in the Auditory verbal comprehension (AVC) section of Western Aphasic Battery-Kannada (WAB-K); (c) all were right-handed before the stroke; (d) free from other cognitive deficits; (e) degenerative neurological conditions, and psychiatric conditions such as dementia or schizophrenia. Before the enrolment in the study, informed consent was taken from all the participants. Furthermore, the Ethical Committee at All India Institute of Speech and Hearing, Mysuru (WF-179/2018-19) approved the study protocol.

2.2 Materials

Western Aphasic Battery-Kannada (WAB-K) was used to gauge the type and presence of aphasia (Shyamala et al., 2008). Stroke and Aphasia Quality of Life-39 (SAQOL-39)-Kannada version assessed the health-related quality of life in PWAs (Kiran & Krishnan, 2013). SAQOL-39 comprised 39 questions across four different domains. The domains were physical (seventeen items), psychosocial (eleven items), communication (seven items), and energy (four items). Mini-Mental State-Examination (MMSE) was deployed

Table 1: Demographic details of the participants.

ID	Age/G	Education	Occupation	TPO	Etiology	Diagnosis at pre-treatment	Diagnosis at post-treatment
P1	64/M	Graduation	Panchayat secretary	60 months	L-MCA CVA	Broca's aphasia	Broca's aphasia
P2	42/M	Matriculation	Real estate	48 months	L-MCA CVA	Broca's aphasia	Broca's aphasia
P3	24/M	Graduation	Hotel management	3 months	L-MCA CVA	Anomic aphasia	Anomic aphasia
P4	41/M	Graduation	LIC agent	3 months	L-MCA CVA	Anomic aphasia	Anomic aphasia
P5	31/F	12th grade	Homemaker	11 month	L-MCA CVA	Conduction aphasia	Anomic aphasia
P6	38/M	Post-graduation	Private employee	4 months	L-MCA CVA	Anomic aphasia	Non- -aphasic
P7	36/M	Post-graduation	Private employee	7 months	L-MCA CVA	Broca's aphasia	Broca's aphasia
P8	50/M	12th grade	Business	4 months	L-MCA CVA	Broca's aphasia	Broca's aphasia
P9	27/M	Graduation	Engineer	5 months	L-MCA CVA	Anomic aphasia	Anomic aphasia
P10	26/M	Graduation	Student	40 months	L-MCA CVA	Transcortical sensory aphasia	Anomic aphasia
P11	47/m	12th grade	Driver	7 months	L-MCA CVA	Anomic aphasia	Anomic aphasia

TPO = time post onset; L-MCA CVA = left hemisphere cerebrovascular accident.

to rule out cognitive deficits in PWAs (Folstein et al., 1975).

2.3 Variables analysed in the study

The dependent variables considered in the study were the physical, psychosocial, communication, and energy domains of QOL. SCVTr therapy is the semantic treatment used in this study; hence, it is the independent variable.

2.4 Procedures

The study was carried out in two phases. In phase 1, Semantic Cueing Verbs and its Thematic Roles (SCVTr) therapy was rendered to all PWAs who participated in the study. In addition, the therapy outcome was measured across pre-, mid-, post-, and follow-up phases. The researcher deployed stringent criteria to move from the pre- to mid- to post-treatment phases. PWAs had to achieve 50% improvement or complete a minimum of 15 sessions to reach the mid-treatment phase. For the post-treatment phase, PWAs had to achieve 80% improvement. For the follow-up phase, they had to complete at least one month after the cessation of the treatment. The detailed steps of SCVTr therapy are provided in **Table 2**. The outcomes computed for SCVTr therapy are not documented in the present study as it is published as the phase 1 study (Deepak & Goswami, 2020).

In phase 2, the SAQOL-39 questionnaire was administered in pre-, mid-, post-, and follow-up phases after SCVTr therapy. At each phase of therapy, the questionnaire was counterbalanced to avoid familiarity and exposure effects. Stroke and Aphasia Quality of Life -39 (SAQOL-39)-Kannada version was employed in the study to gauge the health-related quality of life The questions under each domain are as easy and succinct as possible.

The test was carried out in a relatively quiet room. Each domain was presented with suitable examples, and specific instructions were given for the aforementioned domain. All the instructions were presented via auditory mode by the study's first author. SAQOL-39 is a self-rating questionnaire, wherein the administration of the questionnaire has the flexibility to administer based on the severity, comprehension deficits, and preferences of PWAs.

Expressly, SAQOL-39 necessitates the PWAs to complete the questionnaire based on a 'five-point' rating scale. If PWAs had difficulty reading or understanding the content, the researcher read the questions to the participants. If PWAs could still not apprehend the questions, then the researcher elucidated the questions with similar examples or rephrased the questions more simply. In the current study, few PWAs had hemiparesis. In such instances, the authors modified the outcome of the response to identification. PWA was instructed to indicate the rating corresponding to the question rather than fill it out.

In addition, after administering the questionnaire, researchers randomly selected 'five' questions across the domains. They solicited the PWAs to rate the questions to avoid false positive and false negative responses.

To delineate the rating scale, a score of 'one' was marked when the PWAs could not perform the task,

'two' when PWAs performed the task with the most difficulty, and 'three' when PWAs performed the task. with moderate difficulty; 'four' when PWAs performed the task with mild difficulty; and 'five' when the participant did the task with no difficulty.

The overall SAQOL–39 was computed by averaging the scores. The individual domain scores were also determined in the same way. The maximum score on the test is '195'. The overall mean and domain scores were represented in the whole number without decimal points (numbers ending in 0.5 exactly or more are rounded away from 0. For example, 3.64 is rounded to 4). The higher the scores, the better the quality of life.

Finally, based on the participants' scores, Quality of Life (QOL) was determined. The scores were categorised as severely affected QOL to normal QOL. Every participant's level of QOL was computed, and scores on the five-point rating scale were further categorised as follows: A score of '1' or '2' refers to severely affected QOL; '3' refers to moderately affected QOL; '4' refers to mildly affected QOL; and '5' refers to normal QOL.

2.5 Analysis

The data computed for QOL measures were subjected to qualitative and quantitative analysis. QOL measures were analysed across pre-, mid-, post-, and follow-up phases. For qualitative analysis, the researcher set some predefined criteria to claim improvement/no improvement across the treatment phases.

The researcher posited no improvement if the score increased by 0-5 points. Modesty improvement was claimed if the score surpassed >5 and ≤ 10 points across the treatment phases. If the score increased by >10 points, robust improvement was posited. The predefined score range for maintenance effect was ≤ 0-5 points maintenance effect; increment or decrement >5 and ≤10 points- modest maintenance effect; increment or decrement of >10 points- failed to accomplish maintenance effect.

Quantitative analysis was done using Statistical Package for Social Science (SPSS). Friedman's test was applied to compare the QOL across pre-treatment, mid-treatment, post-treatment, and follow-up phases. Friedman's test was used owing to the skewness of the data.

3.0 RESULTS

The current study deployed qualitative and quantitative measures to evaluate the impact of Semantic Cueing Verbs and their Thematic Roles (SCVTr) therapy on QOL. In supplement to this, the study also analysed the data using a visual inspection method (Kratochwill, 2012).

Table 2: Procedures for detailed SCVTr therapy

Steps	Objectives	Procedures
1	Retrieval of verb and the corresponding agent and patient	• A semantic cue for verb /akalisu/(Yawing) was introduced through auditory mode • If the subject fails to respond, a visual cue (Flashcard of /akalisu/) and written cue was introduced simultaneously. • Even after introducing visual and written cues, maximum cueing strategies were provided if the subject failed. I.e. /akalisu/(Yawing)/yeddelu/ (Wake up)/toli/(washing)/pujisu/(Praying) picture card was presented. Out of these, subjects should identify /akalisu/(Yawing). • After successfully retrieving the verb, participants are asked to retrieve the agent and patient corresponding to the verb. In this example it was /Magu/(Baby) /hasigejalli/(Bed); if the subject failed to retrieve the agent and patient, similar cueing strategies were used as mentioned above.
2	Reading aloud agent patient and verb pair	• Participants were asked to read /Magu/(Baby)/hasigejalli/(Bed)/ akalisu /(yawing). If the subject fails to read, the researcher will read for the subject.
3	Generating who, where, whey and when the question for the generated pairs	• /yaru hasigejalli akalisu/('who' yawned in the bed). If a subject fails to answer, the subject should select from these choices /magu/(Baby)/raitha/(farmer). • Likewise, similar strategies were used for the questions related to /jalli/(where) /javaga/(When) and /jake/(Why) questions.
4	Semantic judgment of the generated pairs	• /huli/(Tiger) /hasigejalli/(Bed)/ akalisu /(Yawning) (inappropriate agent) here subject should respond by saying 'YES" or 'NO'. Likewise, similar strategies for the following questions were employed.
5	Retrieval of the verb with promoting	• In step 5, the subject should retrieve the verb/akalisu/(Yawing). If participants failed, the semantic cue/navuu nidde bandaga yenu madutivi/(what we do when we get to sleep) was given.
6	Retrieval of verb and corresponding agent and patient	• Here, subjects were asked to retrieve the verb / akalisu/(Yawing) of their own, as well as the relevant agent and patient (/Magu/(Baby) /hasigejalli/(Bed)) corresponding to the verb retrieved.

At the outset, the group data computed were fed into Statistical Package for Social Science (SPSS Inc. Chicago, Version 26.0) software for statistical analysis. Shapiro-Wilk's test was deployed to assess the normality, and the computed data skewed away from the standard distribution curve ($p<0.05$). Thus, a non-parametric test was employed to analyse the group data. Furthermore, effect sizes were also noted based on the z-scores using the formula effect size (*re*) = *Z/ √N* (Rosenthal, 1991), where *N* signifies the total number of observations. Effect size (r_e) of <0.3, 0.3-0.5, and >0.5 were considered low, medium, and high effect sizes, respectively (Field, 2005).

QOL was assessed across pre-, mid-, post-, and follow-up phases, and the findings were delineated using qualitative and quantitative methods. The qualitative scores for QOL measures showed a pronounced effect across pre- to mid- to post-treatment phases for most participants, such as P2, P5, P6, P7, P10, and P11. Participants P3 and P9 ameliorated performance until the mid-treatment phase and reached the ceiling afterwards. Participant P8 displayed inconsistent performance across the treatment phases. Participant P4 displayed a ceiling during the pre-treatment phase itself. Meanwhile, participant P1 showed no improvement across pre- to post-treatment phases (**Table 3**).

The maintenance effect was assessed by comparing the scores of post and follow-up phases. The participants P3, P4, P5, P6, P7, P9, P10, and P11 manifested a good maintenance effect. Participants P1 and P8 showed a minimal increment in scores from the post-to-follow-up phase, signifying a modest maintenance effect. On the other hand, the scores of participant P2 increased radically from the post to the follow-up phase, indicating a poor maintenance effect (**Table 3**).

The scores computed for QOL measures were further analysed quantitatively. **Table 4** shows the median and interquartile ranges for the measures of QOL. As shown in **Table 4**, the median scores of QOL increased drastically from the pre-treatment phase to the mid-treatment phase to the post-treatment phase across all PWAs. In addition, a good maintenance effect was evinced across all PWAs.

To ascertain the statistical difference, Friedman's test was performed to compare the quality of life across the phases of therapy, and the results showed significant differences across the phases of therapy (χ^2 (3) =16.67, p <0.05). Subsequently, the data were subjected to pair-wise comparison after applying Bonferroni correction. Results showed no significant difference between the pre and mid-treatment phases (p >0.01) and mid and post-treatment phases (p >0.01). However, a significant difference was noted between the pre-treatment and post-treatment phases (p <0.01). The effect size measure for pre and post-treatment was high (r_e >0.5), indicating a large magnitude of change. Additionally, there was no significant difference between the post-treatment and follow-up phases (p >0.01), indicating a good maintenance effect across the post to the follow-up phase (**Table 5**).

Table 3: Quality of Life (QOL) measures of participants Across the treatment phases.

ID.	Pre-treatment	Mid-treatment	Post-treatment	Follow-Up
P1	123 (3)	123(3)	120 (3)	129(3)
P2	88 (2)	98(2)	130 (3)	157(4)
P3	161(4)	195 (5)	195 (5)	195(5)
P4	195 (5)	193(5)	195 (5)	195(5)
P5	145 (4)	192(5)	195 (5)	195(5)
P6	130 (3)	158 (4)	163 (4)	159(4)
P7	135 (3)	175(4)	192(5)	192(5)
P8	185(5)	189(5)	185(5)	193(5)
P9	189 (5)	195(5)	195(5)	195(5)
P10	152(4)	182(5)	177(4)	177(4)
P11	178 (5)	179 (5)	195(5)	191(5)

The maximum score on measures of Quality of Life is 195; scores within the bracket are converted by the total number of questions '39' to categorise the severity of QOL according to the SAQOL-39 manual.

Table 4: Mean, Median, and interquartile range of QOL across the treatment phases.

Phases	Mean (SD)	Median	Interquartile Range
Pre	152.83(32.88)	152.00	55.00
Mid	170.82(32.25)	182.00	35.00
Post	176.55(27.49)	192.00	32.00
Follow-up	179.82(22.16)	192.00	36.00

Table 5: Results of pairwise comparison for Quality of Life between the treatment phases.

Phases	*N*=11		
	|Z|	*p*	r_e
Pre vs Mid	1.899	>0.01	-
Mid vs Post	0.908	>0.01	-
Pre vs Post	2.807	<0.01*	0.59
Post vs Follow-up	0.743	>0.01	-

* = significant difference; Effect size (r_e) = Z/ √N, r_e < 0.3 denotes low effect size, r_e =0.3 - 0.5 denotes medium effect, r_e > 0.5 denotes high effect.

3.1 Visual inspection method

The study analysed the data based on the level, trend, immediacy, overlap, and consistency following the Kratochwill et al. (2012) protocol.

The level is determined by analysing the score of the pre-treatment phase and further categorising the level as high or low. To claim the participants have a high level, they should score >70%, and scores <70% are deemed low-level. The data trend can be delineated as increasing or decreasing or stable scores compared to those computed at their pre-treatment phases. The immediacy effect is documented by comparing the scores of the pre-treatment phases with the mid-treatment phase. Overlap is analysed by observing pre-, mid-, and post-treatment phase scores. If the scores were similar across the phases, then the data was said to be overlapping or non-overlapping. Otherwise, consistency in the data was analysed by comparing the scores of the post-treatment and follow-up phases.

On analysing the level of the participants on QOL measures, the participants P1, P2, P6, P7, and P9 showed low-level baseline scores. Apart from the participants above, all others evinced high-level baseline scores (**Figure 1**). On analysing the trends, the participants P2, P3, P5, P6, P7, P9, P10, and P11 exhibited increasing trends. Participants P1 and P4 displayed a stable trend, and participant P8 evinced a decreasing trend. Immediacy effects were noted in most participants except participants P2, P4, P8, and P11. Overlap in the data was analysed, and the findings showed a pattern of overlap in participants P1, P4, and P8. Apart from these participants, others manifested a non-overlapping pattern (**Figure 2**). Consistency in the data was observed, and most participants displayed consistency in the scores, except for P1 and P8 (**Figure 3**).

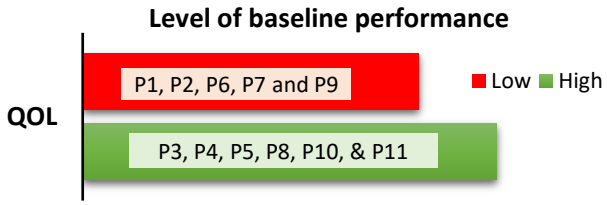

Figure 1. Level of baseline performance of all participants.

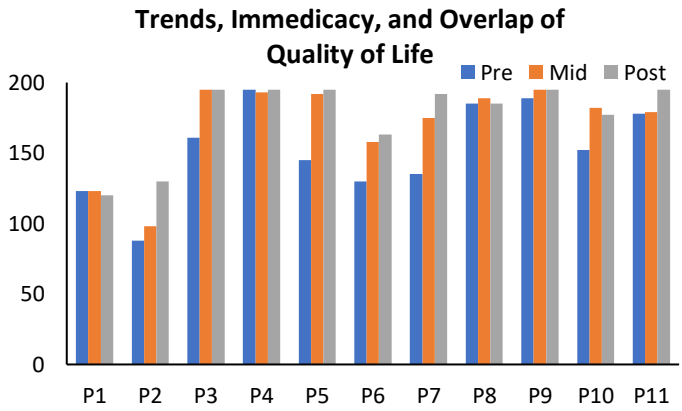

Figure 2. Trends, immediacy, and overlap of data Across all participants.

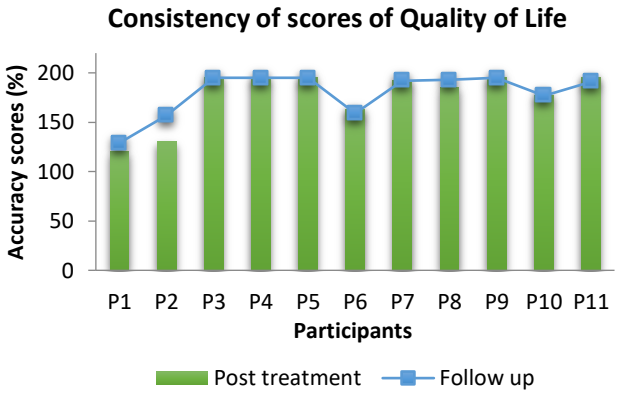

Figure 3. Consistency of scores across post and follow-up phases of all participants

4.0 DISCUSSION

The present study aimed to document the changes in QOL after SCVTr therapy in PWAs. Analysis of QOL measures discerned significant differences in analysing the group data. Individual data analysis evinced radical changes across the treatment phases in most participants except for Participant P1. In supplement to this, the maintenance effect was also analysed. The group analysis revealed no significant difference across post and follow-up phases, indicating a good maintenance effect. The maintenance effect was also assessed individually, and the results discerned good maintenance in the preponderance of participants, except for participant P2.

The positive changes in QOL measures agree with previous studies (Edmonds et al., 2009; Edmonds et al., 2014). In these studies, the participants evinced positive gains in functional communication that were ascertained via administering the communicative effectiveness index (CETI) test. Furthermore, caregivers' anecdotal reports posit a positive view of the participants' communication, i.e., they started to spend more time with family, were more involved in the group conversation, and overall improved their socialisation skills.

Hence, owing to all the aforementioned observations, researchers postulated that the VNeST treatment aids in manifesting positive changes in QOL. Van der Gaag et al. (2005) investigated changes in QOL following aphasia treatment. The study's findings upheld the salience of aphasia treatment in manifesting positive changes in QOL. Vickers (2010) also postulated the imperative role of group therapy, which positively impacts QOL. These positive changes contend with undergoing group treatment following stroke.

Due to the widespread semantic activation, the SCVTr treatment utilised verbs as a central element that may facilitate functional communication skills. This widespread semantic activation may occur due to probing the subject and object around the targeted verb. The type of words selected to retrieve for the targeted words was more functionally relevant words such as 'mother' 'water' 'dosa' (Indian pancake), and so on.

In addition, changes in functional communication were plausibly due to probed series of 'Wh' questions (Step 3 of the SCVTr). This step might aid participants in inhibiting the undesired semantic field and activating the intended ideas or thoughts to communicate. Hence, desired or intended communication-related to the context will be encouraged. Due to the aforementioned changes, participants might experience changes in psychosocial factors. Therefore, robustness in communication might show a linear relationship with QOL.

The positive gains in QOL can also be asserted through good social networks, social activity, and social support (Dalemans et al., 2010). The participants who showed amelioration in QOL had an excellent social network with their family, friends, and colleagues. In addition, these participants had a barrier-free environment, owing to good family support. The participants, such as P3, P9, and P11, attended jobs during treatment. All the aforementioned factors and SCVTr therapy yielded fruitful effects on QOL.

Positive QOL can also be asserted to normal to near normal physical mobility, which aids participants in carrying out their daily day-to-day chores independently. In supplement to this, all participants in the study underwent SCVTr therapy, which remediates word retrieval deficits. Therefore, the effect of therapy and the presence of normal to near-normal physical strength aids in portraying good QOL.

On the other hand, despite positive changes in QOL among most participants, participant P1 failed to show positive gains in QOL measures. P1 had severe physical disabilities when compared to other participants in the study, which may have created a barrier for him to participate in the community actively. In addition, the age of P1 was 64 years. Thus, he was less interested in functional, social, and community activities. Hence, all the aforementioned factors would have influenced and alleviated the participant's motivation (Hinckley & Packard, 2001).

However, another elucidation for negative changes in QOL could be because of the sections of SAQOL-39. The SAQOL-39 questionnaire assesses the physical mobility of the participant, as the scores on this section are at the lower end. Thus, the overall scores of QOL are portrayed to be poor.

Participant P8 evinced varied performance across pre-, mid-, and post-treatment phases. This could be attributed to a higher score in the pre-treatment phase; hence, the participant can achieve only marginal improvement. Additionally, other factors such as life events, personality aspects, emotional stability, and environmental factors might contribute to the stable scores on the measures of QOL. Participant P8 had discontinued from job post-stroke. This change in their routine might have resulted in social isolation and, thus, discerned not much improvement in QOL.

Interestingly, participant P4 discerned ceiling scores on the measures of QOL. This can be asserted to factors like (1) normal physical mobility, (2) less severity of aphasia, (3) regularly attending job post-stroke, (4) good family support and (5) a barrier-free environment. Hence, all these aspects led to good emotional stability and motivational skills, resulting in high performance before therapy. These factors play a pivotal role in maintaining better QOL, as postulated by (Faul et al., 2009).

Furthermore, the scores measured on QOL in the post-treatment phase were maintained even in the follow-up phase among most participants. This shows that the effect of SCVTr therapy persisted in remediating word retrieval deficits even after the cessation of the treatment. Thus, participants were able to use appropriate words as the context demanded. This increases the motivation and confidence level of the participants in maintaining interest in communication per se. As elucidated earlier, all other factors might have potency in maintaining good endurance. Interestingly, participant P2 failed to show a good maintenance

effect, owing to increased performance. This drastic increment in scores could be attributed to familiarising with the SAQOL-39 test manual. However, this elucidation should be posited cautiously as the study has used a counterbalancing strategy to obviate the exposure effect.

5.0 CONCLUSIONS

The current study upheld the potency of Semantic Cueing Verbs and its Thematic Roles (SCVTr) in improving overall communication per se. In addition, the study highlights the endurance effect, which was present even after the cessation of treatment. The study's findings highlight how word retrieval therapy facilitates a positive alteration in QOL. This could be possible because of a wide array of semantic activations, which could aid in maximising words and facilitating desired words based on the context. The study has been efficacious in discerning the results of QOL through qualitative, quantitative analysis, and visual inspection methods.

Thus, the study highlights an effective analysis method in instances of modified pretest-posttest design. Despite the positive changes in QOL following SCVTr therapy, the treatment paradigm might be explored in the discrete type of aphasia with different ranges of severity to claim the therapy is efficacious in enhancing the QOL of PWAs. Hence, a database concerning the discrete type of aphasia with a different range of severity is warranted.

5.1 Clinical implications

The study's findings are an eye-opener for speech-language pathologists (SLPs) as the study shows positive changes in QOL measures after word retrieval treatment. Thus, SLPs should assess PWAs beyond linguistic deficits, and these findings pave the way to documenting improvement even at the psychosocial level. The study suggests SLPs document the QOL in PWAs at both assessment and intervention levels. The SLPs in the Indian scenario can use the SCVTr therapy on PWAs who exhibit a similar linguistic profile analogous to PWAs in the present study.

Specifically, SCVTr therapy facilitates various nouns (subject and object) around the verbs. This aids PWAs in retrieving a wide array of functionally relevant words for day-to-day communication. In addition, this approach can be used in fluent and non-fluent aphasia who exhibit word retrieval deficits. SCVTr therapy approach emphasises semantic cueing as well as phonological strengthening.

Phonological strengthening is achieved by reciting the generated subject + object + verb aloud. This may benefit PWAs who manifest errors at both semantic and phonemic levels.

5.2 Limitations of the study

Due to the small sample size and heterogeneity, the study results cannot be generalised to all PWAs. Hence, the authors suggest extrapolating the current findings with caution. PWAs recruited in the study using the purposive sampling method can be one of the confounding factors while positing the effectiveness of semantic-based treatment on QOL. In addition, authors recruited PWAs with discrete stroke post-onset, discrete type of aphasia, and discrete severity of PWAs. There is a possibility of noting discrete baseline points; thus, the extent of improvement varies across participants.

SAQOL-39 questionnaire used in the study was scored subjectively; hence, there might be chances of false positive or false negative responses. Future studies can inculcate the SAQOL-39 questionnaire and interview method to gauge QOL in PWAs. QOL can be compared specifically to fluent and non-fluent variants of aphasia. This might be important owing to each type of aphasia's different linguistic and physical limitations.

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