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ARTICLE

Identifying Preferred Speech Treatment Approaches among Patients with Parkinson's Disease

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ABSTRACT

Parkinson's disease (PD) is a debilitating neurological disorder characterized by motor symptoms and significant communication impairments that adversely affect patients' quality of life. Nevertheless, few Parkinson's disease patients seek speech therapy, which may worsen their communication challenges as the disease progresses. Given the limited awareness of Parkinson's disease patient preferences regarding speech approaches, speech therapists face a significant challenge in determining which approaches would be most acceptable to these patients. The aim of this study, therefore, was to identify preferred speech treatment approaches among Saudi patients with Parkinson's disease. A Google Form survey was distributed to PD patients to collect data on their demographics, language difficulties, and treatment preferences, as well as factors influencing these preferences. Findings from 74 Saudi patients with PD indicate a preference for Home Exercise Therapy as a speech treatment approach, due to its convenience in location and scheduling. These results underscore the need to recognize patients' preferred treatment methods to encourage regular participation in speech therapy and potentially mitigate the decline of their communication skills. Future research should explore the long-term effects of allowing PD patients to choose their preferred speech treatment approaches as well as the potential benefits of involving families in the decision-making process.

Keywords: Parkinson's Disease; Saudi Patients; Speech Treatment; Home Exercise Therapy

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1. Introduction

Parkinson's disease (PD) is the second most common neurological disorder, trailing only Alzheimer's disease [1]. The condition manifests when the substantia nigra pars compacta in the brain is affected, leading to the degeneration of 50–70% of its dopaminergic neurons [2]. As the disease affects a critical region of the brain, it presents a variety of motor symptoms, including tremor, rigidity, bradykinesia, and postural instability. It can also display non-motor symptoms such as cognitive impairment, bradyphrenia, depression, and apathy [3]. Epidemiological data indicate that males have a higher susceptibility to the condition than females, with a prevalence ratio of approximately 3:2 [4]. While the etiology of Parkinson's disease remains undetermined [5], both environmental and genetic factors are recognized as potential risk factors [5], with advanced age being the factor most commonly associated with the development of the disease.

It is well-documented in the literature that Parkinson's disease can cause multiple dysfunctional changes in language and speech capabilities, and that these deficits are highly prevalent among affected individuals [5]. Various empirical studies have reported that approximately 90% of patients diagnosed with Parkinson's disease exhibit some degree of language impairment at some point during the trajectory of the disease [8]. These impairments, attributed to the effects of rigidity and hypokinesia on the speech organs [9], are collectively referred to as hypokinetic dysarthria, a term encompassing a range of issues, including imprecise articulation, monotony in pitch and volume, reduced stress, and a breathy voice [10]. These communication challenges experienced by individuals with Parkinson's disease significantly diminish their overall quality of life [11] and may be the first symptoms, signalling the onset of the disease. Hazan et al. [12] reported that speech anomalies could be found even in the initial stages of Parkinson's disease, prior to the manifestation of the disease's classical symptoms, which provides an opportunity to begin treatment during the first stage of the disease. In the next section, a more comprehensive analysis of the language impairments associated with Parkinson's disease is provided.

1.1. Language Impairments Found Among Patients with Parkinson's Disease

Multiple language impairments have been reported across studies, one of which is difficulty with verb production. Crescentini et al. [13] evaluated the production of nouns and verbs in 20 non-demented PD patients and 20 age-, sex-, education-, and MMSE score-matched controls. A total of 27 nouns were used in an experiment involving noun/noun and noun/verb generating tasks designed to investigate aspects of selection demands and stimulus-response association strength. The results showed that the two groups showed no differences in the noun-generation tasks; however, the PD patients exhibited greater difficulty in producing verbs. The results also showed that several neuropsychological executive functions (EF) scores were correlated with abnormalities in PD patients' verb generation, which, overall, appeared to be due to the default structure of their semantic networks, in which nouns were most typically associated with other nouns. Given the significant association between executive dysfunction and difficulties with verb production in early stages of PD, the authors concluded that language impairment in early Parkinson's disease patients was most likely caused by underlying neural mechanisms responsible for response selection and inhibition.

In a study involving 22 PD patients with no basic cognitive abnormalities and 20 healthy controls, Bertella et al. [14] found that Parkinson's disease patients had difficulty producing action verbs. In one test, participants orally named 25 pictures of objects and 50 pictures of actions. In another test, they repeated 25 names of objects and 25 names of actions uttered by the examiner. The results showed that early PD patients performed worse than the controls, and their impairment was greater in action naming than in object naming. The authors challenged the explanation that naming actions is more cognitively demanding than naming objects, based on studies indicating that naming objects was more impaired than naming actions in patients with Alzheimer's disease.

Another impairment that has been observed among Parkinson's disease patients is a deficit in action-verb processing. In a study of prime words' effects on subsequent target words, Boulenger et al. [15] matched 10 PD patients w-

ith 10 healthy control individuals for age, gender, educational attainment, and socioeconomic level. Stimuli comprised 140 words (70 action words denoting movement of the hands or legs and 70 imaginable concrete nouns), and 140 pseudowords. These stimuli served as either targets or primes. In addition, 280 non-words were used solely as primes. The results showed that, unlike healthy controls, who showed priming effects for both types of words, PD patients did not demonstrate a priming effect for verbs during their "off" period of L-DOPA. Surprisingly, after administration of the medication, they recovered priming effects for action verbs, which appeared to be as strong as those for concrete nouns, and comparable to those of healthy controls. These findings suggest that as the effect of L-DOPA wears off, processing of action verbs can be selectively disrupted in non-demented PD patients. During the "on" period of L-DOPA, their performance can improve. It was also found that processing of action-related language was somewhat dependent on the motor system.

Monetta et al.[16] reported that PD patients have difficulty interpreting pragmatic meanings. In order to test their ability to understand communicative intentions in stories with underlying verbal irony and lies, the authors matched 11 non-demented PD patients and 11 healthy subjects. They had them answer six questions during the reading of each story, and at the end of the story, they were asked whether the speaker was lying or being ironic. The results showed that PD patients were not as accurate as the controls in answering some of the questions, and more importantly, they showed difficulty in interpreting pragmatic intent. Finally, other language impairments have been reported in the speech of patients with Parkinson's disease, such as abnormalities in vowel articulation[17], imprecise consonant articulation[18], and impairments in speech prosody[19].

1.2. Common Speech Treatments for PD Patients

Among various speech therapies used to address language difficulties in PD patients, one of the most effective is the Lee Silverman Voice Treatment (LSVT), which aims to make their voices louder[20]. PD patients attend 16 hour-long individual therapy sessions, four times a week, for four weeks[21], and complete daily homework tasks throughout the treatment month. In the first half of each treatment session, patients perform three core exercises, which are intended to change the amplitude of the patient's vocal output. These exercises are repeated multiple times, each time requiring more effort, steadiness, and accuracy in vocal volume. In the second half of the session, the speech hierarchy is the focus. During daily assignments, the voice volume that was attained is strategically trained into speech[22].

The second most common approach to treating speech impairments in PD patients is articulation therapy. As the aim of this approach is to increase speech clarity and understandability by emphasizing the correct generation of speech sounds, it entails a great deal of repetition and focusing on poorly uttered sounds[23]. Thus, LSVT and articulation therapy address different issues in PD patients' speech, where LSVT trains participants to raise the volume of their speech while articulation therapy coaches them to consciously concentrate on the precise placement of their articulators so as to be easily intelligible to the listener[24].

The respiratory exercise strategy is another speech treatment approach utilised in the treatment of Parkinson's disease patients with language difficulties. This is a crucial approach that can yield significant outcomes, such as improved expiratory capacity[25]. Another approach that is often used is vocal exercise, one of the primary purposes of which is to rebalance the subsystems involved in vocal production[26]. With this approach, patients attempt to restore voice quality, flexibility, and control[27]. Another approach that has been shown to improve speech communications, but is not widely used with PD patients, is augmentative and alternative communication (AAC). This approach refers to the use of any means of communication other than oral speech to convey ideas, needs, and wishes[28]. These interventions range from unassisted methods that employ no technology (e.g., gestures and signs) to high-tech voice output communication systems7[29]. AAC has been found to improve the quality of life, benefiting those with neurological impairments that prevent normal speech production[30], including Parkinson's disease patients[31].

As shown above, several speech treatments can be used with PD patients to alleviate speech deficiencies. However, given the limited understanding of patient preferences (e.g., traditional in-person therapy vs. telepractice), challenges speech therapists to determine which approach would be

most advantageous for PD patients. Moreover, the varying symptoms exhibited by PD patients at different stages of the disease further complicate this challenge at each stage. Additionally, it is not a straightforward task for speech therapists to become proficient in and implement the diverse speech treatment approaches, as each requires particular strategies to guide its effectiveness. Moreover, as maintaining the patients' commitment to the treatment is fundamental to its success, asking PD patients about their preferred speech treatment approach may make the task easier for speech therapists.

Therefore, the main purpose of this study was to identify the preferred speech treatment approaches among patients with Parkinson's disease in Saudi Arabia, including any differences in preferences between male and female PD patients, and to examine the factors that influence these preferences. As multiple studies have shown, only 3 to 4% of people with Parkinson's disease receive speech treatment [32]. Addressing the objectives of the study may not only provide valuable insights into the preferences for speech treatment approaches among patients with Parkinson's disease (PD) in Saudi Arabia and the factors influencing them, but also help motivate them to engage in speech therapy. The information can assist therapists and other healthcare providers in developing more personalised and effective speech rehabilitation approaches that can potentially benefit all PD patients at different stages of the disease. To the best of our knowledge, this study is the first attempt to identify the preferred speech treatment approach for patients with Parkinson's disease (PD) in Saudi Arabia. The following research questions are addressed:

Primary Research Question:

Q1: What speech treatment approaches are most preferred among patients with Parkinson's disease in Saudi Arabia?

Secondary Research Questions:

Q2: Which of the following factors, effectiveness, convenience, affordability, or individualization, are considered the most influential in shaping preferences for speech treatment approaches?

Q3: Is there a difference in preferred speech treatment approaches between male and female Parkinson's disease (PD) patients?

2. Method

2.1. Data Collection

An online questionnaire was designed using an anonymous Google Forms survey to gather data. The survey was divided into four main sections. The first section elicited demographic information, including sex, age, education level, and a question related to the duration of the respondent's Parkinson's disease diagnosis. The second section focused on language difficulties, in which patients were asked to indicate the severity of various language issues they were currently experiencing, such as word-finding difficulty, reduced vocabulary, slowed speech rate, dysarthria (slurred speech), grammar and sentence structure difficulties, comprehension difficulties, reading difficulties, and writing difficulties. The third section addressed preferred speech treatment approaches, with participants asked to indicate their preferences among traditional speech therapy, telepractice, home-based exercises, group therapy sessions, and a combination of different treatment approaches. In the fourth section, the participants rated the importance of such factors as the effectiveness of treatment, convenience of treatment (e.g., location, scheduling), affordability of treatment, and individualization of therapy in plans tailored to specific needs, using a scale from 1 (Not Important) to 5 (Very Important). The survey link was distributed through WhatsApp groups and social media pages, as well as groups dedicated to Saudi Parkinson's disease patients, and informed consent was obtained from all participants. The introduction to the survey specified that only Saudi nationals diagnosed with Parkinson's disease were eligible to participate. It also clearly communicated the study's aims and objectives to prospective participants. Additionally, the introduction emphasized that participation was voluntary and that participants had the right to withdraw from the survey at any time. Moreover, it assured participants that their anonymity would be maintained throughout the study. After recruiting a sufficient number of participants, the data were gathered and stored securely in preparation for analysis.

2.2. Sample Characteristics and Descriptive Statistics

Table 1 reports the demographic characteristics of the participants. The study's sample comprised 74 participants, with a notably larger ratio of males (77.03%, n = 57) to fe-

males (22.97%, n = 17). The educational backgrounds of the participants were diverse, with most having completed at least a high school education. Specifically, 32.43% (n = 24) had finished high school, while a significant 43.24% (n = 32) held bachelor's degrees, making it the largest educational category. Smaller percentages of participants had attained master's degrees (4.05%, n = 3) or doctorates (1.35%, n = 1). The age distribution of the sample was broad, with the largest group being those 60 or older (37.84%, n = 28), followed by those aged 50-59 (32.43%, n = 24). The younger age brackets were less represented, with 20.27% (n = 15) in the 40–49 age group, 4.05% (n = 3) in the 30–39 age group, and 5.41% (n = 4) younger than 30. This age distribution reflects the typical demographics of Parkinson's disease, which is more prevalent in older adults.

Duration since their Parkinson's diagnoses varied widely among the participants. The majority had been diagnosed for 10 years or fewer, with 28.38% (n = 21) falling within the 1–5 years range and 31.10% (n = 23) within the 6-10 years range. Smaller proportions had been diagnosed for either less than a year (9.46%, n = 7) or more than 10 years. Specifically, 12.16% (n = 9) had been living with the diagnosis for 11–15 years, and 13.50% (n = 10) for more than 15 years. A single participant (1.35%, n = 1) was uncertain about the duration of the diagnosis.

The above demographic breakdown indicates that the study's findings are most relevant to an older, predominantly male population with relatively high educational attainment. The varied lengths of time since diagnosis also suggest a range of experiences with Parkinson's disease within the group, which could have influenced their treatment preferences and experiences.

Table 1. Demographics characteristics of the participants (N=74).

Gender			**Education**		
	N	Percent		N	Percent
Female	17	22.97 %	Less than High School	14	18.92 %
Male	57	77.03 %	High School	24	32.43 %
Total	74	100.00 %	Bachelor's Degree	32	43.24 %
			Master's	3	4.05 %
			Doctorate	1	1.35 %
			Total	74	100.00 %
Age			**Years with Parkinson Diagnosis**		
	N	Percent		N	Percent
Younger than 30	4	5.41 %	Less than 1 year	7	9.46 %
30-39	3	4.05 %	1-5 years	21	28.4 %
40-49	15	20.27 %	6-10 years	23	31.1 %
50-59	24	32.43 %	11-15 years	12	16.2 %
60 or older	28	37.84 %	More than 15 years	10	13.5 %
Total	74	100.00 %	Not sure	1	1.35 %
			Total	74	100.00 %

Table 2 provides a comprehensive analysis of the language difficulties experienced by PD patients, which highlights the broad spectrum of challenges faced by this population. Notably, word finding emerged as a significant issue, with 36.49% of patients reporting mild difficulty. In comparison, moderate and severe difficulties were experienced by 21.62% and 20.27%, respectively, suggesting that nearly half of the patients struggled significantly with finding the right words, which can negatively impact daily communication.

In addition, a notable percentage of patients reported difficulties with reduced volume, a common symptom in PD that affects speech audibility. Specifically, 35.14% of patients experienced mild, 22.97% moderate, and 17.57% severe difficulties, indicating that a large proportion of the participants may have had challenges being heard and understood. Similarly, slowed speech was prevalent, with mild, moderate, and severe difficulties reported by 36.49%, 27.03%, and 24.32% of the patients, respectively. This slowing can hinder effective communication and affect social interactions.

Dysarthria (slurred speech), a motor speech disorder which affects articulation and clarity and is often associated with PD, was reported by 39.19% of patients as mild, with 27.03% experiencing moderate and 25.68% severe dif-

ficulties. This condition, with which half of the participants struggled, poses significant communication barriers. Furthermore, issues with grammar and syntax were notable, with 33.78% of patients experiencing mild difficulties and 20.27% experiencing severe difficulties, highlighting cognitive and linguistic challenges.

Table 2. Percentages of language difficulties experienced by participants.

Language Difficulties	No Difficulty	Mild	Moderate	Severe	Total
1. Word Finding Difficulty	21.62 %	36.49 %	21.62 %	20.27 %	100.00 %
2. Reduced Vocabulary	24.32 %	35.14 %	22.97 %	17.57 %	100.00 %
3. Slowed Speech Rate	12.16 %	36.49 %	27.03 %	24.32 %	100.00 %
4. Dysarthria (Speech Articulation Difficulties)	8.11 %	39.19 %	27.03 %	25.68 %	100.00 %
5. Grammar and Sentence Structure Difficulties	22.97 %	33.78 %	22.97 %	20.27 %	100.00 %
6. Comprehension Difficulties	37.84 %	24.32 %	20.27 %	17.57 %	100.00 %
7. Reading Difficulties	39.19 %	27.03 %	13.51 %	20.27 %	100.00 %
8. Writing Difficulties	16.22 %	33.78 %	17.57 %	32.43 %	100.00 %

Comprehension difficulties were also prevalent, interfering with the processing of spoken and written language. While 37.84% of patients reported no issues, 24.32% experienced mild difficulties, 20.27% moderate difficulties, and 17.57% severe difficulties. Reading and writing skills were similarly impacted, with reading difficulties rated as mild by 27.03% of the patients and as severe by 20.27%. Writing difficulties were even more pronounced, with severe issues reported by 32.43% of patients. These findings collectively emphasize the extensive range of language impairments in PD, affecting both expressive and receptive language skills.

3. Findings

In this section, the findings are reported as responses to the research questions, beginning with the primary question: What speech treatment approaches are most preferred by patients with Parkinson's disease in Saudi Arabia? To answer this question, the participants' preferences among five different therapy modalities were examined using a scale ranging from "Strongly Disprefer" = 1 to "Strongly Prefer" = 5. The results indicate varied levels of favorability across these therapies. Traditional Therapy was met with a generally neutral to slight preference, as evidenced by a mean score of 3.24 and a median of 3. The standard deviation of 1.03 suggests moderate variability in participants' responses, indicating that while some participants preferred this form of therapy, others were neutral or had a mild disinclination for it. The positive skewness (1.25) and kurtosis (-0.17) suggest that more participants leaned towards lower preference ratings, and the distribution was slightly flatter than normal.

Telepractice Therapy, on the other hand, received a mean score of 2.99, also close to neutral, with a median of 3. This indicates that participants were generally neutral or slightly disfavored by this therapy type. The standard deviation was 0.95, indicating slightly less variability than in responses to traditional therapy. The skewness (1.22) and kurtosis (0.16) point to a similar trend, with more responses falling towards the lower end of the scale, resulting in a distribution closer to normal.

Home Exercise Therapy was the most favored among the therapy types, with a mean score of 3.54 and a median of 4, suggesting a general preference. The standard deviation of 0.97 indicates consistent responses towards this modality. The skewness (1.14) and kurtosis (-0.60) reflect a positive skew, with many participants preferring this therapy type, and a distribution flatter than normal, showing a wide range of ratings.

Group Therapy and Combination Therapy had mean scores of 3.16 and 3.15, respectively, indicating a neutral to slightly positive preference. The standard deviations were 1.07 for Group Therapy and 1.01 for Combination Therapy, suggesting moderate variability in responses. The skewness (1.29 for Group Therapy and 1.21 for Combination Therapy) indicates a tendency towards lower preference ratings, while the kurtosis values (-0.19 for Group Therapy and -0.24 for Combination Therapy) suggest distributions slightly flatter than normal (**Table 3**).

Overall, these results reveal that participants generally held neutral to slightly positive views towards all therapy types, with Home Exercise Therapy being the most preferred. The consistent positive skewness across all therapy types

suggests that participants were more inclined to give lower ratings, indicating that, while some therapies were preferred, they were not strongly favored overall.

The Kruskal-Wallis test was conducted to determine if there were statistically significant differences in preference ratings among the five therapy modalities (Traditional Therapy, Telepractice Therapy, Home Exercise Therapy, Group Therapy, and Combination Therapy). The test yielded a chi-squared value of 8.79 with 4 degrees of freedom and a p-value of 0.07 (**Table 4**).

Table 3. Descriptive statistics of treatment preferences.

	Mean	**Median**	**SD**	**Skewness**	**Kurtosis**
Traditional Therapy	3.24	3	1.25	-0.17	-1.03
Tele practice Therapy	2.99	3	1.22	0.16	-0.95
Home Exercise Therapy	3.54	4	1.14	-0.6	-0.38
Group Therapy	3.16	3	1.29	-0.19	-1.07
Combination Therapy	3.15	3	1.21	-0.24	-0.87

Table 4. Kruskal-Wallis test comparing differences in treatment preferences.

Kruskal-Wallis Chi-Squared	**df**	**p-Value**
8.79	4	0.07

As the p-value is greater than the commonly used significance level of 0.05, the variations in preferences among the therapy modalities are not large enough to be considered statistically significant; therefore, the null hypothesis cannot be rejected. However, the p-value of 0.07 suggests a trend towards significance, indicating that there might be some differences worth exploring further with larger sample sizes or more refined analysis methods. To address the second research question, regarding factors, among effectiveness, convenience, affordability, and individualization, the PD patients considered the most influential in shaping their preferences for speech treatment approaches, an ordinal logistic regression analysis was conducted. The results are detailed in **Table 5**, with the coefficients (β), standard errors (SE), and t-statistics provided for each predictor variable across the four outcome factors.

Table 5. Factors predicting speech treatment approaches (Ordinal Logistic Regression Results).

	Effectiveness			**Convenience**			**Affordability**			**Individualized**		
	Coeff	**se**	**t**	**Coeff**	**se**	**t**	**Coeff**	**se**	**t**	**Coeff**	**se**	**t**
Traditional Therapy	0.09	0.19	0.46	0.13	0.24	0.53	0.01	0.21	0.01	0.21	0.23	0.89
Telepractice Therapy	-0.29	0.21	-1.35	0.12	0.24	0.52	-0.12	0.24	-0.49	0.19	0.23	0.79
Home Exercise Therapy	0.03	0.22	0.12	0.68***	0.25	2.72	-0.43	0.24	-1.82	-0.08	0.22	-0.37
Group Therapy	-0.15	0.20	-0.73	-0.05	0.25	-0.18	-0.26	0.23	-1.09	0.44	0.25	1.77
Combination Therapy	0.02	0.21	0.12	0.56***	0.25	2.23	-0.31	0.23	-1.36	0.09	0.24	0.42

Notes: *** statistically significant at $p < 0.05$.

Effectiveness of treatment: The results indicated that none of the treatment approaches was significantly associated with perceived effectiveness. Traditional Therapy (β = 0.09, SE = 0.19, t = 0.46), Telepractice Therapy (β = -0.29, SE = 0.21, t = -1.35), Home Exercise Therapy (β = 0.03, SE = 0.22, t = 0.12), Group Therapy (β = -0.15, SE = 0.20, t = -0.73), and Combination Therapy (β=0.02, SE = 0.21, t = 0.12) all demonstrated non-significant coefficients, suggesting that there is no strong evidence that any one approach was perceived as clearly more effective than others. None of the speech treatment approaches held a significant advantage.

Convenience of treatment (e.g., location, scheduling): In contrast, significant findings were observed for convenience. Home Exercise Therapy was significantly positively associated with convenience (β = 0.68, SE = 0.25, t = 2.72, $p < 0.01$), indicating that this approach was perceived

as substantially more convenient than the others. Combination Therapy also showed a positive and significant association with convenience (β = 0.56, SE = 0.25, t = 2.23, p < 0.05), although to a slightly lesser degree than Home Exercise Therapy. These findings suggest that when convenience is a priority, these two approaches are more likely to be favored. In contrast, Traditional Therapy (β = 0.13, SE = 0.24, t = 0.53), Telepractice Therapy (β = 0.12, SE = 0.24, t = 0.52), and Group Therapy (β = -0.05, SE = 0.25, t = -0.18) did not show significant associations with convenience, implying they were perceived as less convenient than others and similar in convenience to each other.

Affordability of treatment: Regarding affordability, Traditional Therapy (β = 0.01, SE = 0.21, t = 0.01), Telepractice Therapy (β = -0.12, SE = 0.24, t = -0.49), Home Exercise Therapy (β = -0.43, SE = 0.24, t = -1.82), Group Therapy (β = -0.26, SE = 0.23, t = -1.09), and Combination Therapy (β = -0.31, SE = 0.23, t = -1.36) all had non-significant coefficients. This result suggests that none of the therapies was perceived as notably more affordable than others, indicating that affordability was not a determining factor in choosing among these treatment approaches, perhaps because they were considered similarly affordable.

Individualized treatment plans tailored to specific needs: The analysis revealed a marginally significant positive association between Group Therapy and the perception of being individually treated (β = 0.44, SE = 0.25, t = 1.77, p < .10). This result suggests that Group Therapy might have been perceived as slightly more favorable over other approaches because of being more individualized, although the significance level indicates that this finding should be interpreted with caution. Neither Traditional Therapy (β = 0.21, SE = 0.23, t = 0.89), Telepractice Therapy (β = 0.19, SE = 0.23, t = 0.79), Home Exercise Therapy (β = -0.08, SE = 0.22, t = -0.37), nor Combination Therapy (β = 0.09, SE = 0.24, t = 0.42), showed significant results, suggesting no strong differences in perceptions of the degree of individualization these approaches provided.

The results pertaining to the third research question in this study, concerning whether there were gender differences in preferred speech treatment approaches, are reported in **Table 6**. The analysis revealed that females had a slightly higher mean preference score for Traditional Therapy (3.53, SD = 1.37) compared to males (3.16, SD = 1.21). Females also showed a higher mean preference score (3.29, SD = 1.53) for Telepractice Therapy than males (2.89, SD = 1.11). However, application of the Wilcoxon test analysis indicated that these differences were not statistically significant.

Table 6. Preferred speech treatment approaches by gender (Mann-Whitney-Wilcoxon Test Results).

	Mean (SD) Female	Male	W	p Value
Traditional Therapy	3.53 (1.37)	3.16 (1.21)	569.00	0.27
Telepractice Therapy	3.29 (1.53)	2.89 (1.11)	578.50	0.22
Home Exercise Therapy	3.71 (1.45)	3.49 (1.04)	576.00	0.22
Group Therapy	3.24 (1.52)	3.14 (1.23)	509.50	0.75
Combination Therapy	3.29 (1.49)	3.11 (1.13)	532.50	0.53

The Wilcoxon test results across all targeted speech therapies (Traditional, Telepractice, Home Exercise, Group, and Combination) consistently showed no significant differences in preferences between males and females. For Traditional Therapy and Telepractice Therapy, for which the differences in preference scores were slightly higher, the p-values were 0.27 and 0.22, respectively, indicating no statistically significant gender-based differences. Similarly, for Home Exercise Therapy, Group Therapy, and Combination Therapy, the p-values were above the 0.05 threshold, suggesting that any observed differences in mean preferences between genders were not statistically meaningful. These results indicate that male and female participants both generally found all five therapies equally acceptable, supporting the use of these therapies in a generalized and inclusive manner without the need for gender-specific adaptations.

4. Discussion

This study aimed to identify the preferred speech treatment approaches among Saudi Parkinson's disease patients, evaluate the factors influencing these preferences, and exam-

ine any gender disparities. Home Exercise Therapy emerged as the most preferred and Telepractice Therapy as the least preferred speech treatment approaches among patients with Parkinson's disease. Also, the results indicated that the preference for Home Exercise Therapy mainly stemmed from its convenience with regard to location and scheduling. Moreover, the results revealed no significant differences between male and female patients in preferences for any of the speech treatment approaches.

These findings suggest that Home Exercise Therapy is the most preferred option for speech treatment among patients with PD, mainly due to its flexibility. As stated by Maas et al.[33], home therapy is beneficial, particularly for PD patients who are seriously afflicted, as it can allow PD patients to engage in speech exercises at their preferred times and spaces, accommodating their mobility challenges, integrating speech treatment into their daily routines, and thus facilitating their participation in training sessions with greater frequency and improving their outcomes and overall quality of life. Another probable reason for preferring the Home Exercises Therapy is that speech treatment for PD patients typically includes voice and language production exercises, and they may not feel comfortable producing speech and making mistakes in the more public space of a treatment facility.

On the other hand, the preference of PD patients for Home Exercise Therapy could be due to anxiety when in an unfamiliar environment, as anxiety is a common symptom among PD patients this population[34], which can significantly impact their quality of life and exacerbate the motor symptoms of the disease[35]. According to Dissanayaka et al.[36], social anxiety is one of the most prevalent types of anxiety among people with Parkinson's disease, who are likely to experience less anxiety in a familiar and private home environment. This assertion is supported by DiNapoli et al.[37], who demonstrated that therapy provided in the home setting can effectively alleviate anxiety, which will increase the efficacy of speech therapy sessions.

One of the significant findings of this study is that Telepractice Therapy for speech treatment was the least favored option, despite its virtual implementation at home. This outcome may be due to the cardinal symptoms of the disease, such as rigidity and tremor, which can interfere with the use of technology devices. Goberman and Whitfield[38] demonstrated that some PD patients experienced difficulties using a computer mouse. Also, Marxreiter et al.[39] found that patients in the later stages of Parkinson's Disease, particularly those with significant motor impairments, were less likely to use smartphones. Conversely, Telepractice Therapy could exacerbate feelings of isolation, which Subramanian et al.[40] reported were experienced by 55% of PD patients and which often lead to depression[41]. Thus, individuals with Parkinson's Disease may tend to disfavor Telepractice Therapy because it excludes the in-person interactions with a speech pathologist or caregiver that is usually a part of Home Exercise Therapy.

While this study offers significant insights into identifying the speech treatment approaches most preferred by Saudi patients with Parkinson's disease, certain limitations must be acknowledged. First, the sample size (n = 74) was relatively small due to the difficulties in recruiting participants diagnosed with a neurodegenerative disorder such as Parkinson's disease. Furthermore, the degenerative nature of the disease can impede participation in research studies, particularly for patients in advanced stages. As this limitation may affect the generalizability of the findings to a broader population, future research with larger sample sizes is recommended to obtain more robust results and improve generalizability. Second, reliance on self-reported health information and language difficulties may have resulted in inaccuracies in the health information provided, resulting in either underreporting or overreporting of language challenges. It is recommended that, to ensure the reliability of the data, in future studies, health information be obtained from official medical records, and language difficulties be assessed using standardized language evaluations. The third limitation is the absence of qualitative comments from the participants, which could have helped them provide reasons for their preferred speech treatment approaches. However, due to the motor difficulties of writing among PD patients, collecting qualitative feedback was not entirely feasible. Future studies could address this gap by incorporating interviews with PD patients.

5. Conclusion

The results of this study have significant implications for healthcare professionals and speech pathologists who work directly with patients with Parkinson's disease. The

primary aim of this study was to identify the speech treatment approaches preferred by Saudi patients with Parkinson's disease. The findings revealed that Home Exercise Therapy was the most favored option among the participants. Telepractice Therapy, in which there was no social interaction between the patient and therapist, was the least favored, These results underscore the importance of incorporating a patient-centered approach into PD patients' treatment plans, which might combine the convenience of at-home scheduling with social interaction between the patient and the visiting therapist, making the speech treatment sessions comfortable and effective for the PD patients and enhancing treatment outcomes. It is also advisable to conduct one-on-one sessions prior to implementing the speech treatment plan to inquire about which approaches the patients find most comfortable. This practice could save speech therapists time and effort in determining the most effective treatment methods for alleviating speech impairments, enabling them to concentrate from the very first session on approaches that align with their patients' preferences as well as increase patients' enthusiasm and willingness to adhere to the treatment directions provided by the therapists.

In future research, the long-term effects of employing preferred speech treatment approaches and the involvement of patients' families in selecting the most appropriate approaches for individuals with Parkinson's disease should be investigated. Overall, this study contributes to the growing body of literature on PD patients' language issues, therapies developed to address these issues, and patients' willingness to adhere to therapies, ultimately enhancing therapeutic outcomes and deepening the understanding of patients' needs.

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Institutional Review Board Statement

Not applicable.

Informed Consent Statement

Informed consent was obtained from all participants involved in the study.

Data Availability Statement

The data analyzed for this study can be made available upon formal request. The author declares that there are no conflicts of interest related to this study.

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Confict of Interest

The author declares no conflict of interest.

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