

## Knowledge of Speech and Language Therapists about Drugs Related to Speech, Language, Voice and Swallowing Disorders

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<https://dx.doi.org/10.5209/rlog.90735>

Received July 28th 2023, First Decision October 10th 2023, Accepted November 6th 2023

**Abstract:** This descriptive study aims to assess the knowledge of speech and language therapists, who assess and treat clients with speech, language, voice, and swallowing disorders, their pharmacology education, and regarding the drugs related to these disorders. This study involved 96 speech and language therapists from different regions of Türkiye. A survey based on the literature was created to assess the level of knowledge of participants about the indications, contraindications and side effects of drugs related to speech, language, voice and swallowing disorders, as well as their pharmacology training. Our study determined that more than half of the participants had a low level or no knowledge about the indications, contraindications and side effects of drugs related to speech, language, voice and swallowing disorders. In addition, 86.5% of participants reported that they had not received adequate training on drugs at the bachelor and graduate level, and 93.8% of participants would like to receive more training on this subject. Since there is no study in literature that assesses the pharmacology knowledge of speech and language therapists, it is envisaged that our research will make a significant contribution to the field and raise the level of knowledge and awareness among professionals.

**Keywords:** drugs; pharmacology; speech-language pathology

### <sup>eS</sup> Conocimiento de los logopedas sobre fármacos relacionados con los trastornos del habla, lenguaje, voz y deglución

**Resumen:** Este estudio descriptivo tiene como objetivo evaluar el conocimiento de los logopedas, que evalúan y tratan a clientes con trastornos del habla, el lenguaje, la voz y la deglución, sobre farmacología y sobre los fármacos relacionados con estos trastornos. En este estudio participaron 96 logopedas de diferentes regiones de Turquía. Se creó una encuesta basada en la literatura para evaluar el nivel de conocimiento de los participantes sobre las indicaciones, contraindicaciones y efectos secundarios de los fármacos relacionados con los trastornos del habla, el lenguaje, la voz y la deglución, así como su formación en farmacología. Los resultados muestran que más de la mitad de los participantes tenían un nivel bajo o incluso ningún conocimiento sobre las indicaciones, contraindicaciones y efectos secundarios de los fármacos. Además, el 86,5% de los participantes informaron de que no habían recibido una formación adecuada sobre fármacos a nivel de licenciatura y posgrado y al 93,8% de los participantes les gustaría recibir más formación sobre este tema. Dado que no existe ningún estudio en la literatura que evalúe los conocimientos sobre farmacología de los logopedas y terapeutas del lenguaje, nuestra investigación supone una contribución significativa en este campo y aumenta el nivel de conocimiento y concienciación entre los profesionales del ámbito.

**Palabras clave:** farmacología; logopedia; medicamentos.

**Summary:** Introduction. Methodology. Results and Discussion. Conclusion. References.

**How to cite:** Birol, N. Y., Yaşar Gündüz, E., & Tosun, S. (2024). Knowledge of Speech and Language Therapists about Drugs Related to Speech, Language, Voice and Swallowing Disorders. *Revista de Investigación en Logopedia* 14(1), e90735. <https://dx.doi.org/10.5209/rlog.90735>

## Introduction

Speech and language therapists (SLTs) work to prevent, assess, diagnose, and treat speech, language, voice, and swallowing disorders in children and adults. SLTs deal with various client populations with disorders. Additionally, SLTs play an important role in the assessment, counselling and therapy processes of individuals with cognitive-communicative impairments in cognitive aspects of communication such as attention, memory, problem-solving, and executive functions (American Speech-Language-Hearing Association, n.d.-a). Speech disorders arise when a person has trouble making speech sounds accurately or fluently (for example, stuttering is a type of disfluency) or when he or she has issues with his or her voice or resonance (American Speech-Language-Hearing Association, n.d.-b). Language disorders are characterized as an impairment in one or more language components that affects comprehension and expression (National Academies of Sciences, Engineering, and Medicine, 2016). Voice disorders occur when a person's voice quality, intonation, and volume are abnormal or inappropriate for their age, gender, culture, or geographic location (Boone et al., 2020). Swallowing disorders, also known as dysphagia, are conditions in which an individual experiences disruption in the swallowing process that affects the oral cavity, pharynx, oesophagus, or gastroesophageal junction (Murry, Carrau, & Chan, 2020). All these disorders are examples of the practice areas of SLTs.

Behavioral, pharmacological, and surgical interventions can be used with a multidisciplinary team in the management of speech, language, voice, and swallowing disorders. For example, behavioral interventions such as voice therapy, pharmacological interventions such as baclofen, and surgical interventions such as Type II thyroplasty are used in spasmodic dysphonia (Ludlow, 2009).

Many drugs can have side effects that may contribute to speech, cognitive, voice and swallowing impairments (Do & Schnittker, 2020; Gallagher, 2010; Nemr et al., 2018; Sinha et al., 2015). In order to deliver the most effective and appropriate interventions and with the goal of improving client performance, SLTs need to be aware of whether or not drugs may be altering their clients' performances and how these drugs may be having an effect. It is essential for the SLTs to incorporate consideration of the effects of drugs into the plan of care in order to facilitate collaboration with other professionals, such as physicians, nurses, and pharmacists; and to deliver care that is patient-centered.

The readiness of a person for a speech, language, voice and swallowing assessment, their ability to attend assessment tasks and their capacity to make progress in therapy can all be negatively impacted by cognitive impairments. It may be difficult for clients to remain attentive, pay attention, and retain key information such as safe swallowing precautions if they are taking drugs that suppress the nervous system or make them feel fatigued throughout the day (Lawton et al., 2022; Youse, 2008). Clients may also feel tired because of the drugs. Antiepileptics, benzodiazepines, antidepressants, antipsychotics, narcotic analgesics, antihistamines, and antiemetics are some examples of the types of drugs that have the potential to cause sedation or diminished arousal (Johnson, 2013). Cognition has a close relationship with swallowing (Jo, Hwang, & Pyun, 2017). Dysphagia can also occur as a side effect or complication of some drugs. For example, chemotherapy or long-term antibiotic using may facilitate esophageal infections. Such as xerostomia or decreased oral hygiene due to drugs can also indirectly trigger dysphagia (Aslam & Vaezi, 2013; Gallagher & Naidoo, 2009).

Drugs also have positive impact in managing and treatment of speech, language, voice and swallowing disorders. For example, the pharmacological agents donepezil and memantine are recognized for their widespread use in enhancing cognitive functioning. There is information in the literature that these agents may improve the prognosis of aphasia in relation to cognitive functioning (Cichon et al., 2021). In Cheng's (2022) study, it is found that transient receptor potential channel agonists, Nifedipine and Metoclopramide, can be beneficial for neurogenic dysphagic clients. In addition to these, Ear-Nose-Throat (ENT) doctors play a very important role in the diagnosis and treatment of voice disorders. According to a study, ENT physicians frequently recommend voice therapies administered by SLTs and prescribe antibiotics, proton pump inhibitors, histamine 2 blockers, oral/inhaled steroids, and antihistamines to treat their patients' continuing voice disorder (Cohen et al., 2018). Indeed, although no drugs for stuttering have been approved so far, there are various studies on the investigation of pharmacological treatment such as dopamine-blocking drugs (Maguire et al., 2020).

There is no study examining the level of knowledge of SLTs about drugs related to speech, language, voice and swallowing disorders and the pharmacology training of SLTs. The purpose of this study was to determine and enhance the profession's understanding of SLTs' perspectives and knowledge on the role of drugs in their clinical practice based on their pharmacology education.

## Methodology

### Study Design

This research is a cross-sectional descriptive study that questions SLTs in Türkiye about their knowledge of drugs related to speech and language therapy and their pharmacology education.

### Participants

This study included 69 females and 27 males in Türkiye between the ages of 22 and 54 (mean = 28.30, SD = 6.01), for a total of 96 SLTs. Table 1 lists the demographic characteristics of the participants. According to Cangı and Toğram's (2020) study, approximately 750 certified SLTs can provide clinical services in Türkiye. Using the Raosoft Sample Size Calculator, the sample size for the study was determined to be 92, with a population size of 2.000, a 95% confidence interval, and a 10% margin of error (Raosoft Incorporated, 2004).

**Table 1. Demographic Characteristics of Participants (n=96)**

<b>Demographic Characteristics</b>	<b>f</b>	<b>%</b>
<b>Gender</b>		
Male	27	28,1
Female	69	71,9
<b>Age</b>		
20-29	66	68,8
30-39	24	25,0
40-49	5	5,2
50-59	1	1,0
<b>Region of Employment</b>		
Aegean Region	7	7,3
Black Sea Region	2	2,1
Central Anatolia Region	34	35,4
Eastern Anatolia Region	2	2,1
Marmara Region	43	44,8
Mediterranean Region	8	8,3
<b>Education Level</b>		
Bachelor degree	39	40,6
Master degree	43	44,8
Doctorate degree	14	14,6

Ethical approval was obtained from Istanbul Medipol University Non-Invasive Clinical Research Ethics Committee on 02/03/2023 with decision number 211, indicating that there was no ethical issues in conducting this research. All participants were provided informed consent in writing after receiving written information about the study.

### **Data Collection Tool**

The “Speech and Language Therapists’ Knowledge of Drugs Associated with Speech, Language, Voice and Swallowing Disorders Survey” was developed by the authors of the study after a review of the relevant literature in order to assess the pharmacology training and knowledge of SLTs regarding drugs associated with speech, language, voice and swallowing disorders (SLVSDs).

Our survey consists of three sections with a total of 21 questions: Demographic Questions, Knowledge Questions Associated with Speech, Language, Voice and Swallowing Disorders Drugs and SLTs’ Pharmacology Education Questions. There are a total of 8 questions regarding gender, age, region of employment, education level, work experience, work sector, client group, and disorders examined in the “Demographic Questions” section.

In the subsection of “Knowledge Questions Associated with Speech, Language, Voice and Swallowing Disorders Drugs”, there are a total of 7 self-assessment questions that evaluate the information sources about drugs, the status of getting information about the drugs used by the client when evaluating the client for the first time and the extent of the information received, the status of taking into account the drugs used by the client when planning the intervention and the level of knowledge about the indications, contraindications and side effects of the drugs related to SLVSDs. Never (1), Seldom (2), Sometimes (3), Often (4), and Always (5) are acceptable 5-point Likert-type responses to the questions about obtaining information about the client’s drug use during the initial evaluation and when planning the intervention. Questions assessing the level of knowledge regarding the indications, contraindications, and side effects of drugs related to SLVSDs require a 5-point Likert type responses of None (1), Low (2), Medium (3), High (4), and Completely (5). SLVSDs whose knowledge level about its indications, contraindications and side effects has been examined are as follows: Motor Speech Disorders, Voice Disorders, Swallowing Disorders, Aphasia, Cognitive Communication Disorders, Stuttering, Cluttering, Speech Sound Disorders and Childhood Language Disorders.

In the subsection “SLTs’ Pharmacology Education Questions”, there are a total of 6 questions about SLTs’ status of taking pharmacology courses in their bachelor and graduate education, how important SLTs find it to take pharmacology courses in their bachelor and graduate curricula, SLTs’ opinions on whether they have received adequate training on drugs related to SLVSDs in their bachelor and graduate education, and SLTs’ desire to receive more training on drugs related to SLVSDs. The questions of how important SLTs consider taking pharmacology courses in their bachelor and graduate curricula require answers as Not important (1) Slightly important (2) Moderately important (3) Important (4) Very important (5).

After the survey was created, expert opinion was obtained from three expert SLTs about the clarity and suitability of the questionnaire items in terms of evaluating SLTs’ knowledge of drugs related to SLVSDs and SLTs’ pharmacology education. Then, a pilot implementation was carried out with 10 SLTs and the final decisions were given (Supplementary File).

## Data Collection Process

"Microsoft Forms" was used to convert the survey into an online form. The survey was shared on social media and data were collected between 5 May 2023 - 5 July 2023. The survey takes each participant approximately seven minutes to complete.

## Data Analysis

IBM SPSS Statistics 29.0 software was used to analyse the data. Frequency and percentage values were calculated as descriptive statistics. Microsoft Excel was used to generate the graphs.

## Results and Discussion

This study provides an overview of SLTs' knowledge levels and sources of information about drugs associated with SLVSDs, as well as their consideration of drugs in client intervention and attitudes toward receiving undergraduate/graduate pharmacology education. 96 SLTs were surveyed for this purpose using a survey developed by the authors.

Table 2 shows the participants' work-related characteristics. 78.1% (n = 75) of the participants have work experience of five years or less. 44.8% of the participants (n = 43) are employed by the Special Education and Rehabilitation Center, 35.4% (n = 34) by the Private Clinic, 27.1% (n = 26) by the Hospital, and 22.9% (n = 22) by the University. Among the SLTs who participated in the study, 83.3% (n = 80) reported working with both children and adults, 14.6% (n = 14) reported working only with children, and 2.1% (n = 2) reported working only with adults. The SLTs in our study were found to work with a wide range of disorders. Our sample is representative of all clinical practice areas of SLTs.

**Table 2. Participants' Work Related Descriptive Characteristics (n=96)**

<b>Work Related Characteristics</b>	<b>f</b>	<b>%</b>
<b>Professional Experience as a SLT</b>		
Less than 1 year	20	20,8
1-3 years	32	33,3
3-5 years	23	24,0
5-9 years	12	12,5
9-15 years	6	6,3
More than 15 years	3	3,1
<b>Work Sector</b>		
Hospital	26	27,1
Private Clinic	34	35,4
Special Education and Rehabilitation Centre	43	44,8
University	22	22,9
<b>Age Groups of Clients</b>		
Pediatric only	14	14,6
Adult only	2	2,1
Both pediatric and adult, predominantly pediatric	49	51,0
Both pediatric and adult, predominantly adult	22	22,9
Equal weight of pediatric and adult	9	9,4
<b>Types of Disorders</b>		
Aphasia	50	52,1
Cognitive Communication Disorders	32	33,3
Developmental Language Disorders	74	77,1
Feeding and Swallowing Disorders	34	35,4
Fluency Disorders	69	71,9
Motor Speech Disorders	53	55,2
Speech Sound Disorders	79	82,3
Voice Disorders	40	41,7
Autism Spectrum Disorders	60	62,5
Hearing Loss	32	33,3
Syndromes	57	59,4

Based on the results of our study, it can be concluded that very few SLTs have knowledge about the indications (Figure 1), contraindications (Figure 2), and side effects (Figure 3) of drugs. This finding is consistent with prior research indicating that SLTs have limited knowledge of drug effects (McLellan et al., 2017).

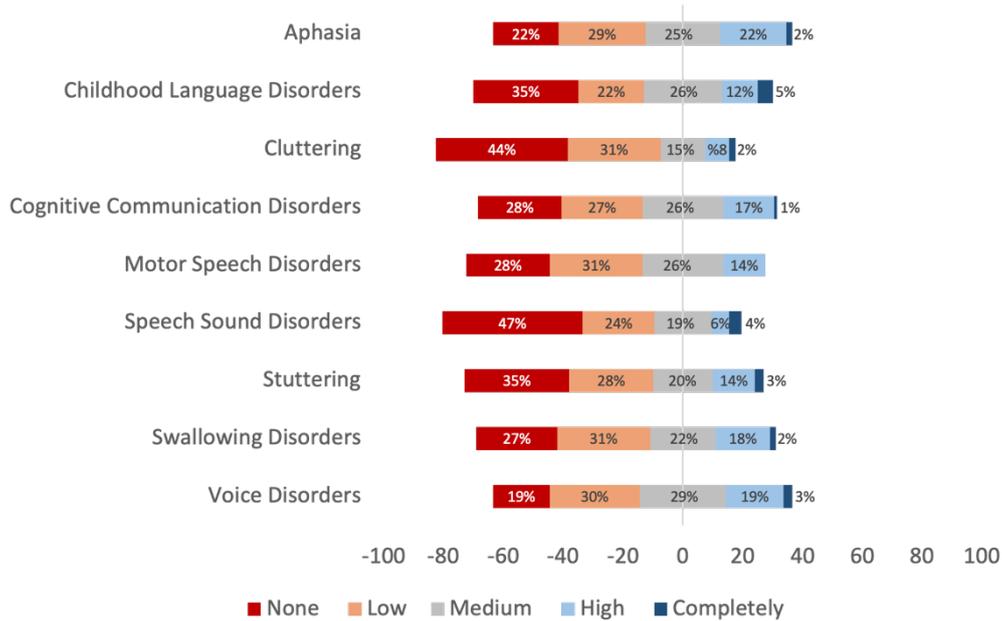


Figure 1. Participants' Knowledge Levels of Indications for Drugs Related to Language, Speech, Voice and Swallowing Disorders

Looking at the level of knowledge of SLTs in more detail (Figure 1), it can be seen that cluttering (n = 72, 75%) and speech sound disorders (n = 68, 71%) are associated with the lowest levels of knowledge (None and Low) about the indications of the drugs. Except for voice disorders, more than half of the SLTs reported having no or low knowledge of the relevant drugs for all other disorders. Participants' lack of or low level of knowledge about the indication of drugs for disorders such as speech sound disorders and cluttering may be due to the fact that there is no proven direct prescription drugs for these disorders so far. Quite few SLTs stated that they have sufficient (High or Complete) knowledge about the indications of the drugs. Participants were found to have the highest level of knowledge about the indications of drugs related to aphasia (n = 23, 24%) and voice disorders (n = 21, 22%).

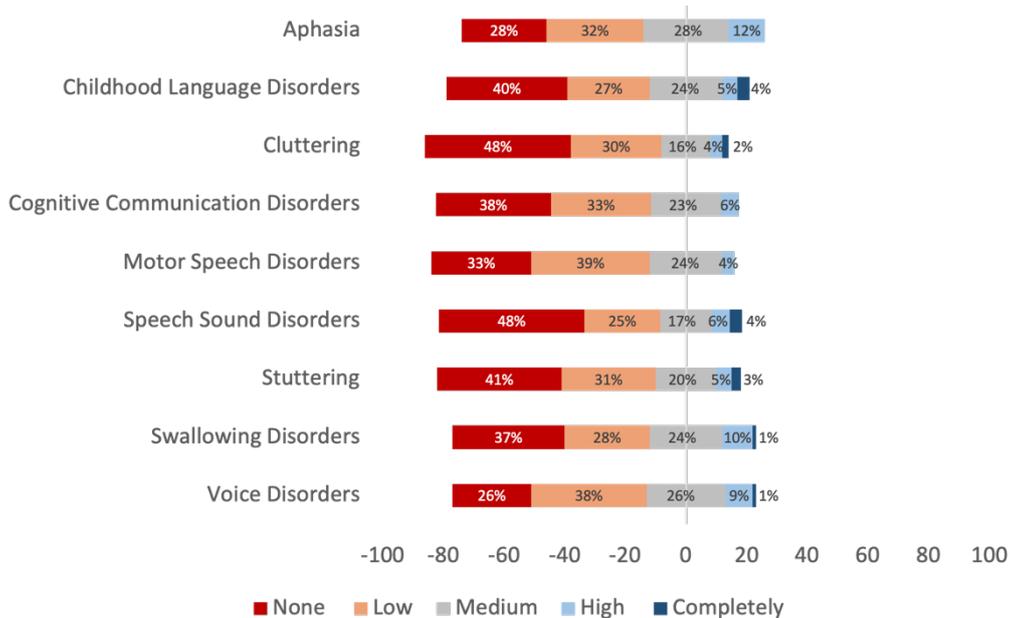


Figure 2. Participants' Knowledge Levels of Contraindications for Drugs Related to Language, Speech, Voice and Swallowing Disorders

Regarding drug contraindications (Figure 2), more than half of the SLTs reported insufficient knowledge (None or Low) for all groups of disorders. Similar to Figure 1, cluttering (n = 75, 78%) and speech sound

disorders ( $n = 70$ , 73%) were calculated as the categories with the least knowledge. The number of SLTs reporting adequate knowledge (High or Completely) is quite low, and the greatest rates were calculated for aphasia ( $n = 11$ , 12%) and swallowing disorders ( $n = 11$ , 11%). Comparing the rates for all disorder categories reveals that the SLTs' knowledge of contraindications is more limited than their knowledge of indications.

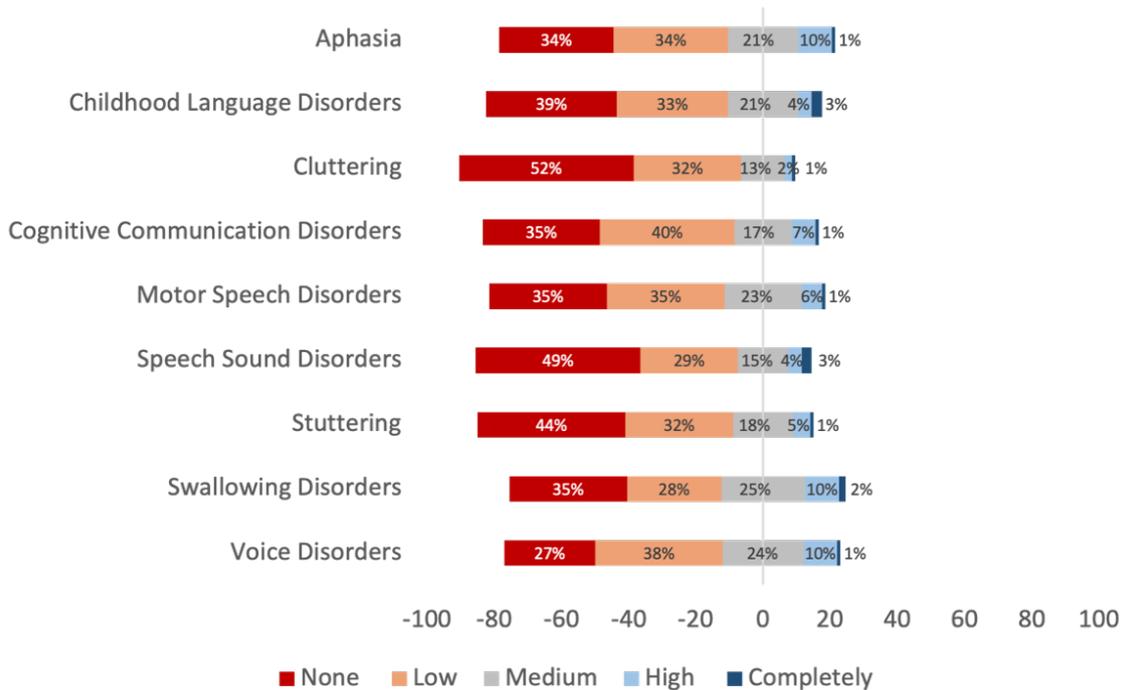


Figure 3. Participants' Knowledge Levels of Side Effects for Drugs Related to Language, Speech, Voice and Swallowing Disorders

More than half of SLTs across all categories consider their knowledge of the side effects of drugs to be inadequate (None or Low). Cluttering ( $n = 81$ , 84%) and speech sound disorders ( $n = 75$ , 78%) are the groups in which the side effects of drugs are least well-known. Similar to the Figure 1 and Figure 2, the number of SLTs that indicate that they have sufficient (High and Complete) information about the side effects of drugs is quite low. In this regard, swallowing disorders ( $n = 12$ , 12%), voice disorders ( $n = 11$ , 11%), and aphasia ( $n = 10$ , 11%) have the highest rates of knowledge of side effects (Figure 3).

As stated in the literature, SLTs cannot be expected to have comprehensive knowledge of pharmacology; however, for an effective and appropriate intervention plan, SLTs must expand their pharmacology knowledge (Lawton et al., 2022). In contrast, the results of our analysis indicate that SLTs in our study have insufficient drug knowledge. Examining the demographic characteristics as depicted in Table 1 and the work related descriptive characteristics as described in Table 2 of the participants reveals that a substantial proportion of participants are between the ages of 20 and 29 ( $n = 66$ , 68.8%) and have less than five years of work experience ( $n = 75$ , 78.2%). Given that people's level of knowledge will increase as their working experience grows, this may be a factor contributing to their low level of knowledge about drugs associated with related disorders.

In the literature, a lack of pharmacology resources for SLTs is noted. Due to the diversity of SLT client groups, the various conditions underlying the disorders, and individual differences, it does not appear possible to provide comprehensive information in a single source about drugs related to SLVSDs (McLellan et al., 2017). SLTs participating in our study stated that they have access to various sources of information on drugs related to SLVSDs disorders (Table 3). 59.4% of respondents ( $n = 57$ ) indicated that they accessed the Pharmacology Course for information source. Internet ( $n = 41$ , 42.2%) and Academic Journal Articles ( $n = 43$ , 44.8%) are the next most common information sources. Although participants have access to a variety of sources of drugs and pharmacological information, additional training, seminars, and academic research are necessary. In this regard, it may be suggested to broaden and diversify the resources. On the other hand, Pharmacists ( $n = 11$ , 11.5%) themselves were the source of the least amount of information for study participants. By drawing attention to this finding, SLTs should be reminded of the significance of multidisciplinary work with experts who have extensive pharmacology knowledge. In light of the fact that drugs can influence SLT practices, it is essential to enhance client intervention outcomes and raise SLTs' awareness of this issue (Gallagher, 2010; McLellan et al., 2017).

**Table 3. Descriptive Statistics of Participants' Information Sources on Drugs, Consideration of Client's Drugs in Evaluation and Intervention**

<b>Knowledge Questions</b>	<b>f</b>	<b>%</b>
<b>Source of Information Drugs Related to SLVSDs<sup>a</sup></b>		
Academic Journal Articles	43	44,8
Congresses, Conferences and Seminars	30	31,3
Internet	41	42,7
Pharmacology Course	57	59,4
Pharmacists	11	11,5
Doctors	36	37,5
Other Speech and Language Therapists	35	36,5
Other Health Professionals	31	32,3
Other Courses	27	28,1
<b>Obtaining Information about the Drugs Used by the Client When Evaluating the Client for the First Time</b>		
Never	2	2,1
Seldom	3	3,1
Sometimes	14	14,6
Often	27	28,1
Always	50	52,1
<b>Scope of Drugs About Which Information is Obtained</b>		
All drugs used by the client	78	81,3
Drugs associated with SLVSDs	18	18,8
<b>Taking Drugs into Account When Planning the Client's Intervention</b>		
Never	20	20,8
Seldom	32	33,3
Sometimes	23	24,0
Often	12	12,5
Always	6	6,3

<sup>a</sup>Speech, Language, Voice and Swallowing Disorders

In the Türkiye National Core Curriculum for Speech and Language Therapy (TNCCSLT) (2016), it was indicated that clients' pharmacological/drug use records should also be obtained when planning an assessment in the field of SLT. Also, American Speech-Language-Hearing Association (2016) recommends reviewing the client's drugs in the SLT assessment. A significant proportion of SLTs ( $n = 77$ , 80.2%) obtained information (Always or Often) about the drugs their clients used during the first time evaluation, according to the findings of our study (Table 3). According to this result, it can be concluded that during the evaluation, SLTs do not ignore information about the client's drug use. In this regard, the proportion of SLTs who stated that they obtained the record of all drugs used by the client, not only about SLVSD, was higher ( $n = 78$ , 81.3%). This is of utmost importance due to the fact that some drugs have the effect of causing conditions that may be of interest to SLTs, even though their use is not directly related to SLVSDs. For instance, it is stated that certain antidepressants can aggravate swallowing difficulties following a stroke (Logemann, 1998), that certain anticholinergic drugs may cause salivary hypofunction leading to, speech and swallowing difficulties (Singh & Papas, 2014), and that antihistamines may worsen voice problems by drying up the upper respiratory tract and larynx (Cho, 2013; Murry & Rosen, 2000).

It is seen that despite obtaining a large quantity of information during the evaluation, only a small percentage of SLT takes the client's drug use into account when planning intervention (Table 3). According to the findings of this study, only a minority of SLTs ( $n = 18$ , 18.8%) often or always consider the client's drugs when planning interventions. More than half of the SLTs ( $n = 52$ , 54.1%) stated that they never or seldom take the client's substance use into account when planning intervention. This may be due to the fact that SLTs are unable to incorporate this record in intervention planning due to their limited drug knowledge. This result of our research appears to be consistent with the results of another study involving 205 SLT participants (Lawton et al., 2022). In the study mentioned, 43% of SLTs reported that they regard sometimes or never take into account the drugs of their clients.

The TNCCSLT (2016) lists pharmacology as one of the sciences that constitute the foundation of SLT field. In this regard, it is anticipated that SLTs will have knowledge of the properties, side effects, and mechanisms of action of drugs relevant to their practice areas. However, the results of our analysis indicate that pharmacology curriculum training is limited (Table 4). Faculties vary in their inclusion of pharmacology courses in their programs. While some departments include pharmacology in the

curriculum, others do not. Given that pharmacology courses are taken in bachelor and graduate programs, it is evident that SLTs have limited access to current pharmacological information through program coursework. As shown in Table 4, those who received pharmacology education at the bachelor level constitute 28.1% of the participants (n=27), and those who received pharmacology education at the graduate level constitute 29.1% of the respondents (n=16). It should be noted, however, that the overwhelming majority of SLTs believe that pharmacology should be included in their educational curriculum. While 85.4% of the sample (n = 82) of SLTs believe that pharmacology should be included in the bachelor curriculum, this percentage drops to 74% (n = 71) at the graduate level. In relation to these findings, the majority of SLTs in the sample (n = 83, 86.5%) reported that they did not receive adequate training on drugs related to SLVSDs during their bachelor and graduate education. As shown in Table 4, 93.8% of the participants (n = 90) were in favor of receiving additional education about drugs associated with related SLVSDs. According to these findings, the majority of SLTs claim to have insufficient or no knowledge of pharmacology; however, they appear eager to learn. Lawton et al. (2022) described a similar result before. In their study, 88.8% of SLTs who participated expressed a desire to receive additional pharmacology education (Lawton et al., 2022).

**Table 4. Descriptive Statistics of Participants' Pharmacology Education**

<b>Pharmacology Education Questions</b>	<b>f</b>	<b>%</b>
<b>Taking Pharmacology Course in Bachelor Education</b>		
Yes	27	28,1
No	69	71,9
<b>Importance of Having Pharmacology Course in the SLT Bachelor Curriculum</b>		
Not important	2	2,1
Slightly important	6	6,3
Moderately important	6	6,3
Important	56	58,3
Very important	26	27,1
<b>Taking Pharmacology Course in Graduate Education</b>		
Yes	16	29,1
No	39	70,9
<b>The Importance of Having Pharmacology Course in the SLT Graduate Curriculum</b>		
Not important	1	1,0
Slightly important	6	6,3
Moderately important	18	18,8
Important	50	52,1
Very important	21	21,9
<b>Receiving Sufficient Education About Drugs Related to SLVSDs in Bachelor and Graduate Education</b>		
Yes	13	13,5
No	83	86,5
<b>Request for More Education on Drugs Related to SLVSDs</b>		
Yes	90	93,8
No	6	6,3

## **Conclusion**

Our study identifies the current education requirements for pharmacological knowledge in the field of SLT and emphasizes a topic that should be addressed in the education program. However, naturally, SLTs cannot be expected to have the same or similar level of knowledge or education in pharmacology as physicians or pharmacists.

The study's participants are comprised of SLTs educated and employed in Türkiye. In order to generalize to the population, the study included SLTs from various Turkish cities and regions. However, similar research is recommended for other countries in order to comprehend the status of other SLTs knowledge of drug related to SLVSDs. In this study, participants' knowledge levels were evaluated using a self-evaluation survey. In future research, it is recommended that a survey containing more objective information questions, including drug names instead of self-evaluation questions, should be developed.

## Conflict of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Author Contributions

**NYB:** Literature review, study design, data collection, data analysis, preparation of manuscript draft, final manuscript review

**EYG:** Literature review, study design, data analysis, preparation of manuscript draft, final manuscript review

**ST:** Literature review, data collection, data analysis, preparation of manuscript draft, final manuscript review

## Funding Sources

This research did not receive any specific grant from funding agencies in the public, commercial or not-for-profit sectors.

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## Supplementary File

### Speech and Language Therapists' Knowledge of Drugs Associated with Speech, Language Voice, and Swallowing Disorders Survey

#### 1. Demographic Questions

##### 1.1. Gender

- a) Female
- b) Male

##### 1.2. Age

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##### 1.3. City of Employment

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##### 1.4. Education Level

- a) Bachelor
- b) Master
- c) Doctorate

##### 1.5. Professional Experience as a Speech and Language Therapist

- a) Less than 1 year
- b) 1-3 years
- c) 3-5 years
- d) 5-9 years
- e) 9-15 years
- f) More than 15 years

##### 1.6. In which sector do you work? (You can select more than one option.)

- a) Special Education and Rehabilitation Centre
- b) Hospital
- c) Private Clinic
- d) University

##### 1.7. Which age groups of clients do you work with?

- a) Pediatric only
- b) Adult only
- c) Both pediatric and adult, predominantly pediatric
- d) Both pediatric and adult, predominantly adult
- e) Equal weight of pediatric and adult

##### 1.8. Which groups of clients do you work with? (You can select more than one option)

- a) Developmental Language Disorders
- b) Speech Sound Disorders
- c) Fluency Disorders
- d) Aphasia
- e) Cognitive Communication Disorders
- f) Motor Speech Disorders
- g) Feeding and Swallowing Disorders
- h) Voice Disorders
- i) Speech and Language Problems Related to Autism Spectrum Disorders
- j) Speech and Language Problems Related to Hearing Loss
- k) Speech and Language Problems Related to Syndromes

## 2. Knowledge Questions Associated with Speech, Language, Voice and Swallowing Disorders Drugs

### 2.1. From which sources did you get your information about drugs related to speech, language, voice and swallowing disorders? (You can select more than one option.)

- a) Pharmacology course
- b) Other courses
- c) Internet
- d) Doctors
- e) Pharmacists
- f) Other speech and language therapists
- g) Other health professionals
- h) Academic journal articles
- i) Congresses, conferences and seminars

### 2.2. When assessing your clients for the first time, do you obtain information about the drugs they are taking?

- a) Never
- b) Seldom
- c) Sometimes
- d) Often
- e) Always

### 2.3. If you obtain information from your clients about the drugs they are using, what is the scope of the drugs you obtain information about?

- a) All drugs used by the client
- b) Drugs associated with speech, language, voice and swallowing disorders

### 2.4. Do you take into account the drugs of your clients when planning the intervention?

- a) Never
- b) Seldom
- c) Sometimes
- d) Often
- e) Always

### 2.5. Please select your level of knowledge about the indications of drugs for the following disorders.

Disorders	None (1)	Low (2)	Medium (3)	High (4)	Completely (5)
Motor Speech Disorders					
Voice Disorders					
Swallowing Disorders					
Aphasia					
Cognitive Communication Disorders					
Stuttering					
Cluttering					
Speech Sound Disorders					
Childhood Language Disorders					

**2.6. Please select your level of knowledge about the contraindications of drugs for the following disorders.**

Disorders	None (1)	Low (2)	Medium (3)	High (4)	Completely (5)
Motor Speech Disorders					
Voice Disorders					
Swallowing Disorders					
Aphasia					
Cognitive Communication Disorders					
Stuttering					
Cluttering					
Speech Sound Disorders					
Childhood Language Disorders					

**2.7. Please select your level of knowledge about the side effects of drugs for the following disorders.**

Disorders	None (1)	Low (2)	Medium (3)	High (4)	Completely (5)
Motor Speech Disorders					
Voice Disorders					
Swallowing Disorders					
Aphasia					
Cognitive Communication Disorders					
Stuttering					
Cluttering					
Speech Sound Disorders					
Childhood Language Disorders					

**3. Speech and Language Therapists' Pharmacology Education Questions**

**3.1. Did you take a course on pharmacology in your bachelor education?**

- a) Yes
- b) No

**3.2. How important is it to have a pharmacology course in the Speech and Language Therapy bachelor curriculum?**

- a) Not important
- b) Slightly important
- c) Moderately important
- d) Important
- e) Very important

**3.3. Did you take a course on pharmacology during your graduate education? (Participants who have a master's or doctorate degree can answer)**

- a) Yes
- b) No

**3.4. How important is it to have a pharmacology course in the Speech and Language Therapy graduate (master's or doctorate) curriculum?**

- a) Not important
- b) Slightly important
- c) Moderately important
- d) Important
- e) Very important

**3.5. Do you think that you have received sufficient bachelor and graduate (master's or doctorate) education about drugs related to language, speech, voice and swallowing disorders?**

- a) Yes
- b) No

**3.6. Would you like more education about drugs related to speech, language, voice and swallowing disorders?**

- a) Yes
- b) No