Treatment indicators influence speech therapy discharge time

Indicadores de tratamento influenciam no tempo para a alta fonoaudiológica

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ABSTRACT

Purpose: To compare the treatment time for acquired neurological disorders of communication and the reason for discharge of users of a medium complexity care service for two periods: before and after implementation of treatment indicators. **Methods:** A retrospective cohort study was carried out involving the analysis of medical records of users of the Adult Language Sector of the Speech and Hearing Therapy Service of the Integrated Rehabilitation Center, seen before and after treatment indicators implementation. **Results:** 129 electronic medical records of users who remained under treatment until discharge from speech therapy in the two studied periods were analyzed. The mean duration of speech therapy for these users was 10.9 months for the first period and 7.8 months for the second period. After implementation of the indicators with regular reassessments, 72 out of the 89 users continued with treatment. There was a statistically significant difference in the therapy average time and reason for discharge before and after treatment indicators implementation. **Conclusion:** After treatment indicators implementation, there was a reduction of the average speech therapy treatment time for communication disorders and an increase of speech therapy discharge percentage of users seen in a Brazilian service of medium complexity.

RESUMO

Objetivo: Comparar o tempo de tratamento dos distúrbios neurológicos da comunicação adquiridos e o motivo da alta dos usuários de um serviço de média complexidade por dois períodos: antes e após a implementação dos indicadores de tratamento. **Método:** Foi realizado um estudo de coorte retrospectivo por meio da análise de prontuários de usuários do Setor de Linguagem Adulto do Serviço de Fonoaudiologia de um Centro Integrado de Reabilitação, a partir dos registros anteriores e posteriores à inserção dos indicadores de tratamento. **Resultados:** Foram analisados 129 prontuários eletrônicos de usuários que permaneceram em tratamento até a alta fonoaudiológica nos dois períodos estudados. A duração média da terapia fonoaudiológica desses usuários foi de 10.9 meses no primeiro período e 7.8 meses no segundo período. Após a implementação dos indicadores com reavaliações regulares, 72 dos 89 usuários continuaram o tratamento. Houve diferença estatisticamente significante no tempo médio de terapia e do motivo da alta antes e após a inserção dos indicadores de tratamento. **Conclusão:** Após a implementação dos indicadores de tratamento, houve redução do tempo médio de tratamento fonoaudiológico para os distúrbios da comunicação e aumentou o percentual das altas fonoaudiológicas dos usuários atendidos em um serviço brasileiro de média complexidade.

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INTRODUCTION

Aphasia, apraxia of speech and dysarthria are the most common acquired disorders of communication treated at Brazilian speech therapy (ST) services, with most cases caused by stroke[1,2]. Scientific evidence demonstrates the efficacy of ST based on structured programs[3]. Although those are chronic disorders, therapy programs can improve the social interaction and motivation of rehabilitation services users[4].

Clinical protocols standardize the diagnosis and intervention process in health and rehabilitation services[5]. Under this model, there are defined elective criteria for selecting cases, indicating intervention method, the length and frequency of sessions[6], and for performing regular reassessments until discharge. Those programs can be interdisciplinary in nature[7].

The number of patients seeking specialized treatment in public health services has risen[8]. The management report of public health services in the Southeast of Brazil described the data on the activities of its specialized speech and language sector, showing that 535 patients awaited treatment in 2010, a figure which rose to 605 in 2019. Data from the same report showed that, in the sector for rehabilitation of communication acquired neurological disorders, that number increased from 28 patients in 2010 to 45 in 2019[9]. The increase in individuals seeking ST services has created a need to cater for that demand and adapt services accordingly[8], calling for a review of elective criteria[6] and indicators of ST intervention time.

To this end, in 2013, the Federal Board of Speech and Language Therapy released an instrument for indicating treatment time in ST. The guidelines suggested a treatment time of over 12 months for acquired disorders of communication[10]. In a study on acquired disorders of communication conducted at the Integrated Center for Rehabilitation of the State Hospital of Ribeirão Preto (CIRHERP) in the interior of São Paulo state, mean intervention time was 12 months, and aphasia and apraxia of speech were associated with longer ST times[1].

For 10 years, the CIRHERP has provided a public speech-language service, specialized in diagnosis and intervention for individuals with disorders of communication[1,9,11], via a team of specialists in treating adults and elderly[1,6,9]. The service works to predefined elective criteria and receives users referred by primary and tertiary healthcare professionals from the CIRHERP Regional Department of Health covering 26 cities[11]. The implementation of clinical protocols or intervention programs with indication of criteria for diagnosis based on clinical consensus[5] was started in 2013. The clinical protocol defined the following treatment indicators: clinical status, overall goal, initial assessment, reassessment and final assessment, dropout rate, improvement rate, level of outcomes attained, frequency, session duration and time to discharge[12]. The implementation of that standard procedure with treatment indicators based on diagnostic criteria, frequency of assessments, length of sessions and time to discharge had a positive impact on service operation.

The incorporation of quality indicators for managing a public hospital facility improved the care delivered to users, helped guide ST practices and the management of the service[13]. Evidence-based practice and the use of a set of indicators in the management of a ST service were associated with improvements in care delivery[14].

The hypothesis of the present study is that therapy programs with treatment indicators can shorten intervention times for users with aphasia, apraxia or dysarthria and increase the effectiveness of rehabilitation services. Therefore, analysis of the impact of the implementation of clinical protocols with elective criteria, indicators for diagnosis, and structured intervention programs of the CIRHERP helps to elucidate the results achieved by that service for acquired disorders of communication.

The objective of the present study was to compare treatment time and reason for discharge of users with acquired neurological disorders of communication rehabilitated at a specialized service of medium complexity, before and after implementation of a structured program incorporating ST indicators.

METHODS

A retrospective cross-sectional analytical cohort study of secondary documents was carried out. The research was approved by the Research Ethics Committee of Faculty of Medicine of Ribeirão Preto, University of São Paulo, under protocol and permission number 2.017.401 and CAAE 66805317.9.0000.5440. This was a table study and, therefore, no free and informed consent term was applied, although all measures were taken to reduce the risk of disclosing the identity of the service users.

For convenience, electronic medical records of all users admitted to a public service specialized in communication disorders were selected during the period from January 2010 to December 2011 and July 2013 to June 2015. The periods in question were established so that it was possible to compare the results obtained before and after the implementation of a structured clinical protocol, with indicators of time of treatment, which occurred in May 2013.

Participant selection and exclusion criteria

A list of medical records of users seen by the specialist service was obtained from the Electronic Hospital Information System for two periods: I) January 2010 to December 2011; and II) July 2013 to June 2015. Each period spanned 24 months. Period I corresponds to a time during which the structured intervention program with treatment indicators had not been implemented, while period II covers the first phase of program implementation, which time intervals served as the inclusion criteria. Only users with developmental disorder of communication were excluded.

The data collected in institutional documents were recorded on a form with the variables divided into the following categories: a) identification: service registration number, date of birth, age at initial assessment, sex and education; b) presumed speech-language diagnosis: aphasia, apraxia of speech, dysarthria, and co-occurrence with oropharyngeal dysphagia; c) clinical diagnosis of cause of disorder of communication; d) characteristics of treatment by service: date of admission to service: ST performed; ST time in months; reason for speech discharge (therapy discharge or discontinuation).

Data on presumed diagnoses of the disorders of communication were taken from language assessments, generally performed using the Boston Diagnostic Aphasia Examination[15] or the Montreal Communication Evaluation Battery[16]. In cases of motor speech disorder, the presumed diagnoses were based on results on protocols for apraxia of speech[17] and for dysarthria[18]. For screening of communication-related cognitive functions, data were drawn from complementary protocols, such as the Mini-Mental State Exam[19] or others, where applicable.

After collecting that information, the data on disorder of communication (aphasia, apraxia of speech and dysarthria), mean treatment time and reason for discharge for each group were compared: before (2010-2011) and after (2013-2015) implementation of treatment indicators for the Adult Speech-Language Sector.

The statistical software IBM SPSS 22 was employed for all descriptive and inferential statistical analyses. The Kolmogorov-Smirnov test was used to check for normality of the distribution of variables. The chi-square test was used in order to compare the periods before and after implementation of nominal variables indicators, such as sex, disorder of communication, oropharyngeal dysphagia co-occurrence and cause of disorder of communication. The comparison between the two study periods, before and after treatment indicators, was realized by applying the Mann-Whitney test for the interval variables, such

as age, education time, lesion time, therapy time. A probability (p-value) less than 0.05 was considered statistically significant.

RESULTS

General Characteristics of Sample

A total of 172 medical records were analyzed for both periods, 83 before and 89 after implementation of treatment indicators. Of those, 157 users commenced rehabilitation, whereas 15 were assessed and provided with guidance. Of the 157 that commenced the treatment indicated, 129 continued treatment until discharge from therapy. In this study, the data of those 129 users were analyzed, 57 for the prior period to the implementation of the indicators and 72 for the period after the implementation. Sociodemographic and neurological data for all users who were attended until discharge of the service during the study period are given in Table 1.

Users of the CIRHERP with acquired disorder of communication were predominantly male, aged 54-57 years, and had a low educational level. Stroke was the commonest cause of the disorders of communication. Pure dysarthria and pure aphasia were the most prevalent disorders in the group studied, before and after the indicators, respectively.

Table 1. Sociodemographic, neurological and speech therapy data of users for the two periods, before and after treatment indicators

	BEFORE	AFTER	STATISTIC	p
N (129)	57	72		
Male' (N%)	36 (63%)	43 (60%)	$X^2(1)=0.16$	0.691
Age* (SD)	57.7 (14.7)	54.8 (15.8)	U=1866.5	0.379
Education (years)*			U=1853.5	0.508
Mean (SD)	6.7 (4.7)	6.(4.4)		
Median (Minimum-Maximum)	5.5 (0-17)	4.0 (0-22)		
Time since lesion (months)*			U=1711.5	0.288
Mean (SD)	59.1 (98.0)	25.5 (31.6)		
Median (Minimum-Maximum)	24 (1-420)	14 (2-180)		
Disorder of communication (N%)'			$X^2(5)=15.61$	0.008
Aphasia	17 (30%)	41 (57%)		
Dysarthria	19 (33%)	8 (11%)		
Apraxia of speech	0 (0%)	0 (0%)		
Aphasia and Apraxia of speech	15 (26%)	14 (20%)		
Aphasia and Dysarthria	5 (9%)	8 (11%)		
Aphasia, Apraxia and Dysarthria	0 (0%)	0 (0%)		
Apraxia and Dysarthria	0 (0%)	1 (1%)		
Without disorder	1 (2%)	0 (0%)		
Oropharyngeal dysphagia co-occurring with disorders of communication (N%)*			$X^2(1)=0.56$	0.454
With oropharyngeal dysphagia	9 (16%)	9 (13%)		
Without oropharyngeal dysphagia	48 (84%)	63 (87%)		
Cause of disorder of communication (N%)*			$X^2(5)=6.24$	0.284
Stroke	39 (69%)	58 (81%)		
Dementia	4 (7%)	6 (8%)		
Traumatic brain injury	4 (7%)	4 (5%)		
Neuromuscular disease	7 (12%)	2 (3%)		
Brain tumor	1 (2%)	0 (0%)		
Neurological infection	2 (3%)	2 (3%)		

N: number of users. SD: standard deviation. The p values refer to the comparison between before and after each variable; *Mann Whitney Test / 'Chi-Quadrado Test

Comparison of ST time before and after implementation of treatment indicators.

The analysis of therapy time for the two periods studied was based on the data for the 129 users who concluded the treatment.

Data on ST times for the two periods studied, expressed as minimum, maximum, mean, median and standard deviation, are given in Table 2. Comparison of treatment time until discharge from ST of users during the two periods studied reveals a statistically significant reduction in treatment times after implementation of the treatment indicators (U=1488.00, p=0.007).

Reasons for discharge of users from therapy, together with rates, are given in Table 3. The percentage of users that continued treatment until therapy discharge increased, whereas discontinuation rates decreased after implementation of treatment indicators.

DISCUSSION

The implementation of treatment indicators reduced mean ST time for patients with disorders of communication seen by a Brazilian service of medium complexity. In addition, implementation increased the rate of users who continued treatment until discharge from therapy and reduced the number of users that discontinued treatment or were referred to tertiary care services. Those findings will be discussed in the ensuing text.

The mean ST time shown in Table 2 proved shorter for the period after implementation of treatment indicators for users who continued ST treatment until discharge from therapy. Following implementation of the treatment indicators, users commenced therapy, underwent reassessments and received ST feedback every 12 sessions to redefine the treatment plan. Thus, users were regularly made aware of the therapeutic process, its quantitative and qualitative results obtained during the treatment period, and of the goals set when the treatment plan with ST continued. The number of users that continued treatment up until discharge from ST increased after implementation of the indicators. Prior to the introduction of the indicators, users had only one reassessment at time of discharge, where 57 out of the 83 users continued with treatment. After implementation of the indicators with regular reassessments, 72 out of the 89 users continued with treatment. When considering only the 157 users that commenced ST, the difference in percentage of users that continued treatment before (71.3%) and after (93.5%) implementation of indicators is even more marked (Table 3). The results referring to the increase of the quantity of users of the service that attended the treatment until discharge (Tables 1 and 3) suggest that implementing indicators of the results of ST promoted greater adherence to treatment.

Another aspect shown in Tables 1 and 3 is that no referrals of users to high complexity services took place during the second period studied. That outcome is believed not to be directly related to the treatment indicators *per se*, but instead to the greater knowledge on CIRHERP inclusion and exclusion criteria held by professionals responsible for referring service users. Early in the service, those criteria were not known by all professionals or were not defined clearly.

Interestingly, for the second period studied, 10 users received therapy for over 12 months versus 21 users during the first period. The therapy time of the recommendation for these communication disorders is greater than 12 months[10]. Therefore, the treatment indicators helped to guide the treatment plan and reduced the number of users too who have needed therapy for more than one year. There was not constrain treatment time of service users to the limit stipulated in the current operating procedures when there was a need for ST.

When comparing the two periods, it stands out that aphasia had higher occurrence in the second period (57%, while in the first period it corresponded to only 30%) and dysarthria less occurrence, only 11%, since it represented 33% before the indicators. Although aphasia is associated with longer ST times and dysarthria is associated with shorter treatment time[1], the disorder with the need for longer treatment time occurred more in the second period, precisely the moment that showed the lowest average treatment time (Tables 1 and 2). Those findings suggest that the analysis of treatment time was more

Table 2. Comparison of language therapy time for aphasia, apraxia of speech and dysarthria, before and after implementation of treatment indicators, of users who continued treatment until discharge from therapy (months)*

	Before treatment indicators	After treatment indicators	Statistic	p
N (129)	57	72		
Median (Minimum- Maximum)	10 (1-37)	6 (1-31)	U=1488.00	0.007
Mean (SD)	10.9 (7.6)	7.8 (5.5)		

N: number of users. SD: standard deviation. The p values refer to the comparison between before and after each variable. *Mann-Whitney Test

Table 3. Reason for discharge of users who commenced speech therapy for aphasia, apraxia of speech and dysarthria, before and after implementation of treatment indicators (%)

	Before	After	Total
Discharge from therapy	71.3% (n=57)	93.5% (n=72)	82.2% (n=129)
Discharge for discontinuation	18.7% (n=15)	6.5% (n=5)	12.7% (n=20)
Referral to tertiary care	10% (n=8)	0% (n=0)	5.1% (n=8)

n: number of users.

influenced by the implementation of the indicators than by the type of communication disorder.

The rates of the disorders studied after the implementation of treatment indicators are in line with those of another Brazilian ST rehabilitation service in high complexity care[2]. Thus, the results for rates of acquired disorders of communication could be considered by different services with similar demand profiles in terms of types of disorder treated.

Oropharyngeal dysphagia is another condition which can co-occur with disorders of communication in neurological diseases. In the present study, dysphagia was present in more than 10% of users seen during the two periods, as shown in Table 1. In another study, dysphagia was present in 55% of users with neurological disorders, associated with speech and language disorders[20]. This disparity in dysphagia occurrence among studies is due to the type of neurological disease studied. While most participants in the present study had stroke, most patients in another study had neuromuscular diseases, in which dysphagia is a common symptom.

Stroke was the leading cause of disorders of communication in the present study, akin to another investigation on acquired disorders of communication, in which 69.5% of the sample had stroke-induced neurological lesion[2]. Of the users analyzed in this study, 69% and 81% had stroke in the first and second periods, respectively. In the second leading cause of communication disorders, there were differences, being the neuromuscular disease accounts for 12% of cases before the implementation of the indicators and dementia for 8% of cases after of indicators. Thus, the cause of the disorder of communication and co-occurrence of those conditions are directly associated with the demand for the service and should be considered for ST rehabilitation.

This study revealed that implementation of treatment indicators, with regular reassessments based on normative data, favored the definition of treatment plans and feedback to service users, increased the number of visits, shortened the waiting list, and also improved both treatment adherence and the quality of the service delivered.

Therefore, an improvement of effectiveness was observed in a Brazilian ST service of medium complexity following implementation of treatment indicators. That finding corroborates the results of another study which showed performance improvement in ST services and benefits for users after measuring of indicators[14].

The present study has some limitations. Information on presence of comorbidities and on contextual factors associated with the therapy process was not available from the medical records of users. Those aspects can promote discharge for discontinuation or contribute to treatment continuation. Neurological information on the severity, extent and location of lesions would also aid in the analysis of the data. The general characteristics of users were studied, but the severity of the disorder of communication and type of aphasia, apraxia of speech or dysarthria should be taken into account in therapy and service planning, given that more severe aphasias, such as global or Wernicke´s aphasia, can require much longer treatment times than aphasia conduction, for example. This project reflects the reality of the studied periods, therefore, the interpretation of those findings on other dates must consider the various regional epidemiological variables of the moment.

CONCLUSION

The implementation of treatment indicators in a Brazilian service of medium complexity reduced mean ST time for patients with disorders of communication and increased the percentage of ST discharges, as it promoted greater adherence by users to treatment.

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Author contributions