

Educational Technologies for Intervention for Students in Hemodialysis Treatment of the Hospital Class ABC Nefro

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Abstract—The objective of this study was understanding the importance of educational technologies for interventions for students with Chronic Renal Failure (CRF) in hemodialysis treatment. We investigated socioeducational indicators and level of quality of life of patients / students aged 15 to 72 years. For this, an applied intervention research with quantiquantitative approach was carried out. Data collection was done through documentary research, socioeconomic questionnaire, School Performance Tests (TDE) to evaluate the reading and writing levels of students and records of participant observation. The educational technologies were constructed collaboratively with the teachers and in their application was used graphic material and mobile digital technologies. The results obtained indicate that 92.8% have memory difficulties; 50% had poor reading and writing performance. The study indicated the need for a curricular adaptation, with the use of technological pedagogical resources (tablets and digital platform) to better learn the students in health treatment. We conclude that digital technologies are pedagogical resources that expand the learning of students with health limitations.

Index Terms—hospital class, students on hemodialysis treatment, curriculum, inclusion, digital technology

I. INTRODUCTION

Inclusion policies had been subsidized by international documents such as: World Declaration on Education for All, 1990; Salamanca Declaration of 1994, Guatemala Convention of 1999 and the International Convention on the Rights of Persons with Disabilities, 2007; and also national ones such as: Decree n° 3.292 / 1990, which regulates Law 7,853/ 89, in order to ensure the full exercise of the individual and social rights of persons with disabilities; (LDBEN, No. 9.394 / 96) with greater flexibility of the parameters for admission / promotion of school, strengthening the integration of students with special educational needs (Brazil, 1996) [1].; National Policy on Special Education in the Perspective of Inclusive Education, in 2008 (Brazil, 2008) [2].; In the Guidelines for Special Education in Basic Education. (Brazil, 2001) [3].

The right to education, in the expression of learning rights, should occur primarily through access to the

school, under the responsibility of the public authority (Brazil, 1988) [4]. In times of social transformation, the construction of knowledge is not restricted only to the formal school environment, given that education occurs in the coexistence between men and women in any age or social context (Cortella, 2017) [5]. In this sense, the hospital, among other services, can carry out educational inclusion of patients / students absent from school due to illness circumstances.

The educational inclusion of people with specific educational needs, in non-formal learning spaces such as hospital environments, is a growing reality in Brazil and in the World. The first record of hospital intervention was in 1935, on the initiative of Henry Sellier (Minister of Health of France), who inaugurated an open-air school in a community of Paris to attend to maladjusted children. This was followed in Germany, Europe and the United States, as a result of World War II (1939-1945) that mobilized hospital engagement in the face of the significant number of mutilated children and adolescents and orphans Vasconcelos, 2006) [6]. Later, new proposals for adaptation of spaces for the care of hospitalized students were implemented in countries such as Belgium, Canada, Chile, Italy, Finland, Holland, Hungary, Mexico, Norway, Portugal, Sweden, among others (González, 2007) [7].

In Brazil the creation of the first hospital class was given in 1950 at the Hospital Boy Jesus in the city of Niterói (RJ), recognized by the MEC in 1994, and remains active. The educational service in hospital environment has legal support in the Federal Constitution of 1988 [4]; in the CNE / CEB Opinion No. 17, dated July 3, 2001 [3], which characterizes the Hospital Class as specialized care for students unable to attend classes due to health treatment that entails hospitalization or prolonged stay at home (Brazil, 2001) [3].; ECA; LDBEN No. 9394/96; Law No. 13.716 / 2018, which amends article 4 of LDBEN No. 9,394 / 96 [1]., reaffirming that educational care is provided to the student of basic education in health treatment in the period of hospitalization for a prolonged period, in a hospital or home regime (Brazil, 2018) [8].

Chronic diseases generally entail limitations of physical and psychological capacity, and may even cause temporary interference with the formal school process or

its rupture (Assis and Valkíria, 2009) [9]. In these cases, the pedagogical service can occur outside the school space - in the hospital or home environment.

Pedagogical listening is fundamental to identify the cognitive and psychological aspects of the student in health treatment, to work with knowledge (Fontes, 2005) [10]. In these circumstances, curricular adaptations are possibilities for learning. Adapting the formal curriculum, when necessary, presupposes making it appropriate to the specificities of students with more specific needs. The curricular adaptation must be articulated with the interests and needs of the students in a dynamic movement, which involves strategies, careful teaching and appropriate to the singular learning modes, considering the life reality of the learning subjects (Brazil, 2008) [2].

The choice of theme is justified by the need to expand studies on the educational inclusion of students with Chronic Renal Failure (CRI) in the context of hospital classes, and also to consider the importance of reflecting on specific issues that interfere in the (WHO, year) and the Brazilian Society of Nephrology (SBN, year) on the incidence of Chronic Renal Disease (CKD) in the world population, and more specifically in the Brazil. The subject matter is the subject of our studies and research, with emphasis on the incorporation of Digital Information and Communication Technologies (TDIC) as one of the didactic resources.

The present study sought to conduct an investigation with students / chronic renal patients in the schooling process, aiming at an educational intervention with curricular adaptation. To do so, specific instruments were used to identify the socio-educational profile of the population under study, to evaluate students' reading and writing skills, and to elaborate educational intervention strategies using digital technologies.

II. DIDACTIC POSSIBILITIES OF MOBILE TECHNOLOGIES IN THE HOSPITAL CLASS

Technology has integrated into people's lives in the so-called Network Society (Castell, 2005) [11], allowing immediate connection and communication between people with exchange of images, texts and audio. Technologies are associated with knowledge, economic, social and political aspects. Mobile technologies can expand educational opportunities for students in any environment, and nowadays, already inserted in the daily activities of the individual, change the way of developing them (Unesco, 2014) [12]. For Bottentuit Jr. (2012) [13], mobile technologies, from the simplest to the most modern, such as Smart TVs, notebooks, iphones, tablets and smartphones allow greater mobility in tasks and greater access to information.

The National Curriculum Framework (BNCC) considers that the repertoire of Information and Communication Technologies (ICT) and digital culture bring significant social changes in various social spheres, especially in education. Hence, the importance of using ICTs in a critical, reflexive and ethical way in social practices (including those in school) to communicate,

access and disseminate information, produce knowledge and exercise authorship in personal and collective life (Brazil, 2017) [14]. In this conception, digital technology presents itself as a dynamic and accessible phenomenon, reducing the communicative distance between people, thus favoring new forms of social inclusion.

III. METHODOLOGY

An applied intervention research was conducted with 14 students / patients with CKD who undergo renal treatment in a public reference hospital in the city of São Luís - MA. The study involved documentary research, curricular adaptation using mobile digital devices. The intervention was carried out using a methodology of Didactic Sequences (SD) and with main theoretical basis, studies of Paulo Freire and students of Hospital Pedagogy for addressing aspects of popular education, curriculum and social inclusion. The approach method was quantified based on studies by Minayo (2015) [15].

The methodological course consisted of: application of a socioeconomic questionnaire to identify the profile of the students; School Performance Testing (TDE), Reading and Writing Subtests (Stein, 2016) [16].; analysis of the curricular proposal of the Municipal Education Department (SEMED); elaboration of educational intervention strategies; application of the intervention and analysis of data through the technique of content analysis (Bardin, 2015) [17]. And statistical analysis with the help of the program Statistical Package for the Social Sciences, Portuguese version 22.0 for preparation of the database and descriptive analysis of some variables; organization and systematization of data. The organization of SD was made in four moments: the first moment with pedagogical listening; in the second moment, the problematization; in the third moment, the organization of knowledge; and in the fourth moment, the organization of knowledge. Mobile digital devices were most frequently used in the third and fourth moments of the didactic sequences.

IV. RESULTS

In the process of intervention, we seek to understand the meanings that ABC Nefro students attribute to education, in view of the daily challenges of living with chronic diseases. This task required the exercise of observation, recording and reflection, on the difficulties of teaching and learning in permanent dialogue with other knowledge, without, however, ignoring the immediate interests of patients. The educational intervention consisted of a pedagogical work with adaptations and approximations between the curriculum proposal of the EJA adopted by SEMED, the theoretical conceptions about Hospital Pedagogy and the Curricular Guidelines that deal with the EJA Mode. The activities developed prioritized some elements: the life reality of the subjects, their limits and possibilities; intercurrents; the clinical and physiological implications of the patient on hemodialysis, motor mobility; time for pedagogic activities; curricular organization; courseware; planning, methodologies and didactic resources used by teachers;

teacher-student relationship; EJA curriculum proposal and scientific production. The socioeconomic questionnaire as well as the TDE was fundamental for defining the thematic axes to be adapted, the research to content and its integration into curricular components. The instruments of data collection made it possible to identify: the student's length of stay in ABC Nefro; interest in studies; personal motivations; changes in physiological, clinical and emotional conditions; period of hospitalization, among other variables.

V. RESULTS AND DISCUSSIONS

In this study, we detected the importance of curricular adaptation for students in renal treatment, especially the use of TDCI as a didactic resource, characterizing the ABC Nefro Hospital School fertile ground for new research. The use of digital mobile technology has enabled students to better understand reading and writing, to stimulate interest in classes, to improve the level of attention in performing activities, as an unfavorable factor in the context of classrooms is that the outpatient setting is not favorable to concentration by virtue of the procedures during hemodialysis.

The results of the research, according to Table I and Table II was constructed, as noted below.

The profile of the sample studied is characterized by 71.4% by the female sex in the Table I. About civil status, 50% of the participants live in a stable union. No participant has an employment relationship, and 78.6% were absent from work as a result of DRC. Only 21.4% declared to be active in family agriculture.

TABLE I. CHARACTERIZATION OF THE STUDY POPULATION

Characteristics	N	%
Sex		
Male	4	28,6
Femme	10	71,4
Civil State		
Not married	2	14,3
Married	3	21,4
Widower	1	7,1
Divorced	1	7,1
Stable union	7	50,0
Active work		
No	11	78,6
Yes	3	21,4

The descriptive statistics of the study population indicates the mean age of 50 years, with a standard deviation of 14.17 in years, according to Table II.

TABLE II. STANDARD DEVIATION OF PARTICIPANTS' AGE

Standard deviation of age	
M ínimum	16 anos
M áximum	70 anos
Average	50 anos
Standard desviation	14,17 em anos

Socioeconomic variables were considered according to the criterion of minimum wage rates (IBGE, 2011), including social benefits. The social class profile of the students is low income, 100% receive a type of social benefit according to data in the Table III.

TABLE III. SOCIOECONOMIC VARIABLES

CARACTERISTICS	N	%
Live with Family		
Yes	14	100,0
People in house		
1 - 3 people	4	28,6
4 - 6 people	7	50,0
Above 6 people	3	21,4
Income family		
One minimum salary	2	14,3
Until two minimum salary	12	85,7
Social Benefit		
Yes	14	100,0

The participant health statement show that 92.9% of them present other chronic diseases, such as diabetes and hypertension, prevalent diseases of CKD. The hemodialysis time variable indicates the same rate of 28.9% for patients aged 1 to 3 years and 7 to 10 years in treatment, 35.7% represents the number of patients over 10 years old, and one student undergoes hemodialysis for 17 consecutive years, according to the Table IV.

TABLE IV. PARTICIPANT HEALTH STATEMENT

CARACTERÍSTICAS OF CRONIC RENAL	N	%
OTHER Chronic disease		
NO	1	7,1
YES	13	92,9
Hemodialysis Time		
1 - 3 years	4	28,6
4 - 6 olds	1	7,1
7 - 10 olds	4	28,6
until 10 years	5	35,7
Transplanted		
No	11	78,6
Yes	3	21,4
Acess for dialysis		
F ístula	10	71,4
Catheter	4	28,6
Vision Problem		
No need use glasses	2	14,3
Need use glasses	7	50,0
Use glasses	5	35,7
Memory Difficulty		
No	5	64,3
Yes	9	14,3

The frequencies that educational variables are demonstrated in the Table V that found over the study time, 35.7% had five years; 28.6%, two years; 21.4%, one year and months. The percentage of 7.1% was repeated for three and four years of study; 14.2% students attend the first phase that corresponds (1st and 2nd grades); 42.9% attend the 2nd phase (3rd and 4th grades). The same percentage applies to students who have completed the 4th grade. The lateral dominance variable indicates that 85.7% are right-handed; equivalence of 7.1% for left-handed and ambidextrous. Regarding the knowledge of the name of the medicines, 85.5%

answered yes and 21.4% did not; and 78.6% answered that yes, and 21.4% said they did not know or forgot about the indication in the Table V.

TABLE V. VARIABLES OF EDUCATIONAL DATA FREQUENCIES

REGISTRATION IN THE HOSPITAL CLASS	N	%
1year	3	21,4
2 years	4	28,6
3 years	1	7,1
4 years	1	7,1
5 years	5	35,7
I Segment and phase in the course		
1 st phase I Segment	2	14,2
2 nd phase I Segment	6	42,9
Egresses I Segment	6	42,9
Lateral Dominance		
Right handed	12	85,7
Left handed	1	7,1
Ambidextrous	1	7,1
Recognizes the name of the medicines		
No	2	14,2
Yes	12	85,7
It includes the indication of the medicinal		
No	3	21,4
Yes	11	78,6

The results of the TDE (Reading and Writing Subtest) indicate that students in 1st stage (2nd grade) are in the EB-Lower level in the reading subtest, below the average of the TDE that is ≤ 57 hits; in the writing subtest are at the EB-Lower level also below the TDE average that is ≤ 19 hits; the EBT of the subtests was below the TDE classification average that is ≤ 86 points. From the students in the 2nd stage (3rd grade), five students with EB-Lower level in the reading and writing subtests, and one student reached the EB-Superior level in the reading subtest and the EB-Medium level in the writing subtest. The EB of the TDE in the Lower level is ≤ 65 for reading, and ≤ 23 for writing; the EBT corresponds to ≤ 101 points. The EB of the TDE for the Medium Level is 66-68 points for reading and 24-29 points for writing, with EBT of 102-112 points. At the Upper level the EB for the reading subtest is ≥ 69 and for the writing subtest is ≥ 30 , with EBT of ≥ 113 . The student who has reached the EB-Superior level in reading and EB-Medium level in writing, according to with the TDE classification remained at the Medium level with EBT of 102 points. The students in the I Segment who finished 4th grade reached higher levels in the reading subtest: 5 students obtained EB-Medium level and 1 EB-Superior level student in the reading subtest. The same participants obtained in the writing subtest level EB-Medium; the TDE score for this level is 27-31 hits, and the EBT is 112-121 points; the classification at the Upper level corresponds to a score ≥ 122 points. The data the performance rating from the gross scores can be demonstrated in Table VI.

TABLE VI. PERFORMANCE RATING, FROM THE GROSS SCORES BY SERIES

Gross score (EB) by series						
Reading subtest (70 words)			Writing subtest (34 words)			
Student	Serie	Score	Nível Subtest Reading (EB)	Escore	Nível Subtest Writing (EB)	Total EBT
AP3	2 ^a	08	Less	04	less	12
AP8	2 ^a	26	Less	07	less	33
AP1	3 ^a	16	Less	07	less	23
AP4	3 ^a	48	Less	12	less	60
AP5	3 ^a	39	Less	14	less	53
AP6	3 ^a	52	Less	07	less	59
AP11	3 ^a	16	Less	08	less	24
AP12	3 ^a	73	Higher	29	medium	102
AP2	4 ^a	54	Médium	27	medium	70
AP7	4 ^a	67	Médium	28	medium	95
AP9	4 ^a	70	Higher	27	medium	96
AP10	4 ^a	66	Médium	27	medium	91
AP13	4 ^a	32	Médium	27	medium	59
AP14	4 ^a	66	Médium	27	medium	90

VI. FINAL CONSIDERATIONS

In order to find answers about the need for curricular adaptations for students with chronic kidney disease undergoing hemodialysis and how they can be organized in practice, we carried out a study of the EJA / SEMED curricular proposal in a relationship of dependence with the work of the EJA in to place the research in a particular context of the school curriculum. The hypothesis initially conceived of the need to adapt the school curriculum, is confirmed in the result of the application of the TDE (Reading and Writing Subtests). It was also evidenced that the physical and emotional instability of the patient and the environment of the hemodialysis room are aspects that interfere in the school activities. However, the SD methodology and the technological resources used in the intervention with the target audience indicate that more than 50% obtained good performance and satisfactory performance.

The research presented limitations such as: interferences; frail health and restrictions imposed by the CKD. However, they constitute significant objectives of expanding studies in the area, because in the teaching and learning process, curriculum and didactic method imply intentional actions, planned with clear, concrete objectives.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

Margareth Santos Fonsêca contributed by doing the research. Lívia da Conceição Costa Zaqueu guided and performed the data analysis. The authors approved the final version.

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