


Discourses on technologies in home care: contributions between innovating, inventing, and investing

Discursos sobre tecnologias na atenção domiciliar: contribuições entre inovar, inventar e investir

Discursos sobre tecnologías en la atención domiciliar: contradicciones entre innovar, inventar e invertir

Kênia Lara da Silva^a 

Patrícia Pinto Braga^b 

Alexandre Ernesto Silva^b 

Lucas Frederico Luiz Lopes^c 

Thiago de Medeiros Souza^d 

How to cite this article:

Silva KL, Braga PP, Silva AE, Lopes LFL, Souza TM. Discourses on technologies in home care: contributions between innovating, inventing, and investing. Rev Gaúcha Enferm. 2022;43:e20200491. doi: <https://doi.org/10.1590/1983-1447.2022.20200491.en>

ABSTRACT

Objective: To analyze the discourses of health professionals about technologies in home care.

Method: Qualitative research conducted in four public home care services in Minas Gerais. Data obtained from interviews with 52 professionals submitted to Critical Discourse Analysis.

Results: The results indicate the functional and economic-financial discourse about the technologies. The economic discourse is dominant and reveals the contradiction between investing in high-cost equipment and the insufficiency of basic inputs for care. There is a tendency to reproduce hospital-centered logic with high technological density. The inventiveness and a process of adaptation at home are evidenced.

Conclusion: The discourses of health professionals indicate that the circumstances of home care are determinants of the adaptations and improvisations that occur in this context and are due to the contradictions between innovating, inventing, and investing in technologies in home care.

Keywords: Biomedical technology. Technological development. Home nursing. Qualitative research. Investments. Diffusion of innovation.

RESUMO

Objetivo: Analisar discursos de profissionais de saúde sobre as tecnologias na atenção domiciliar.

Método: Pesquisa qualitativa realizada em quatro serviços públicos de atenção domiciliar de Minas Gerais. Dados obtidos de entrevistas com 52 profissionais, submetidas à Análise de Discurso Crítica.

Resultados: Os resultados indicam o discurso funcional e econômico-financeiro sobre as tecnologias. O discurso econômico é dominante e revela a contradição entre investir em equipamentos de alto custo e a insuficiência de insumos básicos para o cuidado. Há uma tendência de reprodução da lógica hospitalocêntrica com alta densidade tecnológica. Evidencia-se a inventividade e um processo de adaptação no domicílio.

Conclusão: Os discursos dos profissionais de saúde indicam que as circunstâncias do cuidado domiciliar são determinantes das adaptações e improvisos que ocorrem neste contexto e são decorrentes das contradições entre inovar, inventar e investir nas tecnologias na AD.

Palavras-chave: Tecnologia biomédica. Desenvolvimento tecnológico. Assistência domiciliar. Pesquisa qualitativa. Investimentos em saúde. Difusão de inovações.

RESUMEN

Objetivo: Analizar los discursos profesionales sobre las tecnologías en el cuidado del hogar.

Método: Investigación cualitativa realizada en cuatro servicios públicos de atención domiciliar en Minas Gerais. Datos obtenidos de entrevistas con 52 profesionales sometidos a Análisis Crítico del Discurso.

Resultados: Los resultados indican el discurso funcional y económico-financiero sobre las tecnologías. El discurso económico es dominante y revela la contradicción entre invertir en equipos de alto costo y una atención básica insuficiente. Existe una tendencia a reproducir lógica centrada en el hospital con alta densidad tecnológica. Se evidencia la inventiva y un proceso de adaptación en el hogar.

Conclusión: Los discursos de los profesionales de la salud señalan que las circunstancias de la atención domiciliar son determinantes de las adaptaciones e improvisaciones que se dan en este contexto y se deben a las contradicciones entre innovar, inventar e invertir en tecnologías en atención domiciliar.

Palabras clave: Tecnología biomédica. Desarrollo tecnológico. Atención domiciliar de salud. Investigación cualitativa. Inversiones en salud. Difusión de innovaciones.

^a Universidade Federal de Minas Gerais (UFMG), Escola de Enfermagem, Departamento de Enfermagem Aplicada, Belo Horizonte, Minas Gerais, Brasil.

^b Universidade Federal de São João del Rei (UFSJ), Campus Centro-Oeste Dona Lindu, Curso de Enfermagem, Divinópolis, Minas Gerais, Brasil.

^c Pesquisador Autônomo, Belo Horizonte, Minas Gerais, Brasil

^d Universidade Federal de Juiz de Fora (UFJF), Faculdade de Enfermagem, Programa de Pós-Graduação em Enfermagem, Juiz de Fora, Minas Gerais, Brasil.

■ INTRODUCTION

The Home Care Services (HCS), in Brazil, have been developing with greater expression in the last 30 years. Its consolidation responds to the need for dehospitalization, rationalization of the use of hospital beds, cost reduction and organization of patient-centered care⁽¹⁾. In the public health system, home care (HC) is part of the Urgency and Emergency Network, structured with Home Care Services (HCS) of the Better at Home Program (*Programa Melhor em Casa*)⁽¹⁾.

HC is defined as a substitutive or complementary care modality, provided at home and involves a set of practices that encompass procedures of medium and high density and technological complexity⁽¹⁾.

Health technology is a polysemic term and can be analyzed from different dimensions. In this study, we understand health technology as a set of knowledges and instruments that express, in the care production process, the network of relationships and social encounters⁽²⁾. Health technologies include medicines, materials, equipment and procedures, organizational, educational, information and support systems, assistance programs and protocols, which act as a means of providing health care to the population⁽³⁾. Added to the list of health technologies is a set of relationships and processes understood as non-material used in health practices and from which derive the substitutive character of the care model by giving care greater value in the intersubjective and personal aspects of care.

Intrinsically, home care is supported by material and non-material technologies in view of the nature and unique space in which this care takes place. But home care (HC) also triggers the need to invent new processes, configuring itself as a potential space for technological innovation in the SUS and, consequently, for a new technological composition of care.

In this study, we understand innovation as an activity that is performed with the objective of obtaining new products, technological processes or services, resulting in the introduction of new knowledges or socially useful technologies⁽⁴⁾. The invention is configured as a recomposition or adaptation of an existing device or process⁽⁴⁾. Thus, it innovates when something totally new is produced, unlike inventions that start from a pre-existing model. Innovating and inventing require investments and, in the case of health, these investments represent resources of a financial or non-financial nature, destined to the maintenance or improvement of the health system.

The technological composition is a defining characteristic of the substitutivity of care models that must include different technologies to meet the needs of users. In the hospital-centered model, the use of material technologies predominates. Technological innovation in HC is at the core that is given to non-material technologies. With this, substitutivity is materialized in an act with the inversion of the technological core of work processes, which now has the predominant use of relational technologies⁽⁵⁾.

It is known that the reality of HC is marked by a lack of inputs for care⁽⁶⁾ resulting from the low investment in this care modality, which results in difficulties for families to include home care expenses in the family budget⁽⁷⁾ and also in arrangements, adaptations and improvisations to provide care⁽⁸⁾.

On the one hand, this reality challenges the organization of services, demanding an adequate technological offer for the provision of care at home. On the other hand, it also triggers the need for reflections on how care practices are performed with recognition of the valuation and centrality that are given to each of the technological resources used in care.

In this sense, it is important to investigate how health professionals, working in this care setting, represent the technologies in HC, especially the innovations and inventions present in this field.

In this study, representation is understood from the perspective of the Social Theory of Discourse⁽⁹⁾. Analyzing the discourses allows us to understand the processes, relationships and structures of the material world, thoughts, feelings, beliefs, in short, the social world⁽⁹⁾. More than that, investigating the representational meaning of the discourses allows accessing desires, interests, impotence, beliefs and values that are conveyed to a representation, indicating or not opening for the production of social and cultural transformations⁽⁹⁾.

Thus, the question is: How do professionals represent technologies in HC? What discourses are revealed in this field? It is assumed that the discourses reproduce the hegemonic conception of technology in its biomedical and organizational expression with few elements that incorporate substitutive processes for care in HC.

The hypothesis that guided this investigation is that the technological composition expressed in HC is central to the equipment and inputs revealed as material technologies, to the detriment of the recognition and valuing of substitutive technological means, modes and processes that materialize

in processes and in the care relationship. Furthermore, this format culminates in the ideological representation of professionals on the transfer of the high-density technological equipment to the home environment.

Given the above, this study aims to analyze the discourses of professionals about technologies in HC. The specific objectives were to identify the representational meaning of technologies in HC and discuss the contradictions between innovation, inventiveness and investments to acquire technologies as requirements for the substitutivity of the care model.

■ METHOD

Qualitative study guided by the framework of Critical Discourse Analysis (CDA) as a tradition of qualitative research⁽⁹⁾. The CDA is a method that combines textual-discursive study with social criticism and allows the analysis of contemporary social phenomena or processes, taking a deep look at language and its implications for social reality⁽⁹⁻¹⁰⁾.

In this article, we present results of a multicenter investigation conducted by researchers from three federal public universities. The research scenarios were the home care services in four municipalities in the state of Minas Gerais: Belo Horizonte, Contagem, Pará de Minas and Juiz de Fora. These scenarios were chosen from the structural and organizational assessment of the respective HCS.

The study sampling was intentional, with the inclusion criterion being the fact that the professional was member of the home care team of the city-scenario. In two municipalities that had more than one team, the coordination was asked to indicate the teams with the greatest variability in terms of the profile of users assisted, with two distinct teams being indicated in these municipalities.

Data were obtained from interviews with a semi-structured script, performed in the participants' work environment. The interviews were guided by two semi-structured scripts elaborated by the researchers with open questions: one directed to the coordinators and the other to the professionals of the teams. The questions were about the understanding of technologies, those used daily at work, creations and technological innovations for care in HC. The interviews took place from April 2019 to October 2020 in person. The interviews that took place from April to October 2020 were conducted remotely, on a virtual platform, given the restrictions due to the COVID-19 pandemic.

The final sample consisted of all 52 professionals who comprised the teams at the time of data collection, including five coordinators (CO) because in one of the municipalities

there were two coordinators, fifteen nurses (N), nine nursing technicians (NT) and eight physicians (PH) members of the Multidisciplinary Home Care Teams (MHCT). We also interviewed four physical therapists (PT), four speech therapists (ST), two nutritionists (NU) and five other professionals (occupational therapist – OT, psychologist – PS, social worker – SW, dentist – D and administrative assistant – AD) members of the Home Care Support Teams (HCST). It is noteworthy that the municipality has autonomy to conduct the composition of HCST, defining among specialized professionals those who best meet the assistance profile of the local HCS.

The interviews were conducted by 2 researchers in each scenario, nurses with experience in the qualitative approach, with training at the doctoral or master's level, completed or in progress. They had an average duration of 30 minutes, were transcribed and organized in a database, receiving a code composed of the letter M to indicate the municipality of origin (M1 to M4), followed by an abbreviation and a number assigned to sort by category/professional occupation (e.g. N1 to N15 for nurses, CO1 to CO5 for coordinators, etc).

The participants were mostly female (43), married (21), with time of performance in the services from 1 month to 11 years. In municipality M4 there were 3 professionals admitted just over 1 month ago.

Operationally, the analysis consisted of a transcription movement from spoken to written discourse, followed by readings and markings of the central ideas corresponding to the objectives of the study. In the transcription, juxtapositions between speakers, pauses, silences, intonation, emphasis, interruptions and incomprehensible excerpts were evidenced. The selection of excerpts to be analyzed was performed after reading the transcripts, aiming to reduce the material to data related to the research questions.

An analytical matrix was built to extraction of data from the interviews. Each interview was collectively read by the researchers, seeking to identify, line by line, paragraph/paragraph, the elements related to the axes: definition of technologies and their typologies; inventions, creations and technological adaptations performed in HC; technological incorporations and investments in HC. After this step, the vertical reading of each axis and the transversal reading of the material were conducted, seeking to articulate the social and linguistic perspectives of the discourse, electing the transitivity system as the analytical category for the study⁽¹⁰⁾.

The transitivity is a system that composes a metafunction of critical linguistics in the field of Systemic functional grammar (SFG)⁽¹¹⁾. Through transitivity, it is possible to analyze linguistic texts and sentences that are composed by processes,

participants and circumstances, allowing us to understand the meanings of communicative phenomena⁽¹⁰⁻¹¹⁾.

When responding to the interview on the topic of technologies in HC, the interviewees express, in their discourses, the representation of the activities performed (processes); the people or things involved (participants) and the circumstances of manner, time, place or cause related to the central phenomenon. The role of the discursive analyst is to identify these components and interpret the meanings underlying the discourse⁽¹¹⁾. In this interpretation, with the contribution of the CDA, the researcher establishes the relationship between the text and social practice⁽¹⁰⁾ relying on the evidence expressed in the participants' discourses to dialectically demonstrate the interface between the textual aspects and the social meanings of the discourse⁽¹⁰⁾.

In the presentation of the results, we chose to include charts that point out the textual aspects of the transitivity system, as discussed by Fuzer and Cabral⁽¹¹⁾. In the charts, each column presents the components of the analyzed processes. Relational processes were identified with the carrier elements, attribute, causes/reason that inform the representational meaning⁽¹¹⁾, in the study the meaning about the technologies and their innovative character for the participants. Mental processes were also identified with the experiencer elements, phenomenon and circumstances⁽¹¹⁾ that show how the absence or insufficiency of existing technologies applied in HC are felt or perceived by the participants. Furthermore, the participants' discourse is constructed through creative or transformative material processes with the elements actor, goal, scope or beneficiary affected by the process⁽¹¹⁾ to designate the inventions made by professionals or family members, in the context of HC, expressing the lack of investment in this care modality.

The research was approved by the Research Ethics Committee under protocol 1,160,885. All study participants signed an Informed Consent Form (ICF).

■ RESULTS

When talking about technologies in home care, participants use components of attributive relational processes to describe them, presenting their purpose to improve work or benefit patient care. Relational processes contribute to identify, characterize, qualify people, objects or situations⁽¹¹⁾.

The participants express technology as a resource whose use is associated with practicality, innovation and utility. They attribute to technology the functionality of optimizing,

improving or facilitating the lives of patients, families, caregivers in the mediation they exercise in the professionals' work process. Thus, the discourses emphasize the identification of technology from its cause or reason, as expressed in Chart 1.

In Chart 1, the attribution of meaning to technologies is highlighted as "thing", "everything", "resource" or "that" in an identification that is undefined, but which carries similarity between the members of this HC context because it is repeated in the different municipalities. It stands out the enunciation of technologies such as machine, product or artifact applied to assistance or management.

The innovation of technologies in HC is also attributed to the materiality of something, in general with the use of equipment, devices, systems and applications, as well as exams.

For the participants, novelty is an attribute that characterizes the innovation process with the distinct use of existing equipment in other spaces or for other purposes. This use is emphasized from the circumstances that demand the application of technologies, as shown in Chart 2. It is highlighted, once again, the representational meaning as "things" or "something" imprecise in the discourse.

Unlike the relational processes revealed in the understanding about technologies and their innovation, participants express mental processes to represent the perception, desire or cognition that investments for the acquisition of technologies in HC do not occur or are permeated with limitations. On the other hand, they also express the perception of advances in the use of equipment, especially high-cost equipment, which were previously restricted to other care spaces, being offered opportunities for home care.

Mental processes are discursively portrayed by professionals with narrativizations that explain the absence or insufficiency of existing technologies applied in HC, as shown in Chart 3.

The discourses also show material processes that designate creative or transformative actions conducted by professionals or family members, in the context of HC. These actions are triggered by the circumstances of this care scenario marked by the dialectical relationship between growing and unexpected demands and the insufficient supply of resources. With this, adaptations become routine, expressed by modalized discourses in which professionals recognize, in the goal or scope of their practice, the need to offer a certain action/procedure. With the absence of inputs, they justify, narratively, what they do or how the families provide their arrangements, as exemplified in Chart 4.

Carrier	Relational process	Attribute	Purpose, cause or reason	Code
Technology	is	one thing	that makes life easier	(M2SW1)
	is	everything	you use to reach the ultimate goal, right?	(M2CO5)
In this service [circumstance, technology]	it is like	facilitator		(M3CO1)
	is	a resource	a resource to make it more practical, more usable; make it more functional, more practical, more useful	(M2NU1)
	is	everything all equipment	that helps you that helps you at work	(M4AA1)
Technology	is	what	I'm going to use to optimize, improve, make life easier for my patient in some way	(M3OT1)
		all	that come to add right?	(M1N5)
		Positive things	for care, right	
	is	everything	Interventions aimed at the well-being of the patient and family. (which adds something positive to intervention in a certain case)	(M2PS1)
		every specific thing	used for the benefit of the patient, of us.	(M3PH2)
the technology today [circumstance]	came		to be able to improve or give a better quality of life to these patients of ours	(M1N3)
	is	the evolution of each thing at the moment	to be able to follow up and be able to improve every day what is involved in our work	(M4NU1)
		a new thing	that we can apply to our patient care.	(M3PT1)
technology	is	everything new that is coming. This thing more related to devices, new exams, devices, applications.		(M4ST1)
De tecnologia		only the systems	where we put our services	
one technology	is	the computer	for us to have communication and, for example, this access to this patient demand.	(M3PT1)
		Oximeter	is a micro technology that solves on time	(MEPT2)

Chart 1 – Meanings attributed to technology in HC

Source: Research data, 2020.

Carrier	Process	Attribute	Circumstances	Code
<i>Innovation</i>		<i>anything</i>	<i>that leaves, in quotes, the standard to improve something</i>	(M4PH1)
<i>Perhaps, an innovation</i>	<i>is</i>	<i>something new, something that is unusual</i>		(M2PH6)
		<i>thing that doesn't have to be basically a new thing or just a different application.</i>		
	<i>are</i>	<i>these new things</i>		(M3PT1)
<i>What we have most innovative</i>	<i>is</i>	<i>the mechanical ventilation; respirators</i>	<i>that we are using at home. Because until recently, it was only for restricted use, we are managing to take it home.</i>	(M3PH2)
<i>[Although not a new technology,</i>		<i>the way of use is being innovative;</i>	<i>not the device itself, but the possibility to take it home, to guide the patient in handling, this has been innovative.</i>	
		<i>the telephone</i>	<i>When I say the telephone, it would actually be the smartphone.</i>	(M2PH2)
	<i>are</i>	<i>new things, more and more new.</i>		(M2PH2)

Chart 2 – Representational meaning of technology innovation in HC

Source: Research data, 2020.

Experiencer	Mental Process	Phenomenon	Circumstance	Code
<i>I</i>	<i>guess (cognitive)</i>	<i>that we develop no technology</i>		M3PH1
<i>We</i>	<i>try (desiderative)</i>	<i>to adapt</i>	<i>as much as possible so that we can do our best to provide the best care for the patient.</i>	
<i>I</i>	<i>think that (cognitive)</i>	<i>We always want more, We want the best.</i>		
<i>But also we</i>	<i>have to understand (cognitive)</i>	<i>the limitations within a household</i>	<i>facing a SUS approach.</i>	
<i>You</i>	<i>can't want (desiderative)</i>	<i>everything exactly the same as you would have in a hospital.</i>		
<i>I</i>	<i>think that (cognitive)</i>	<i>we improvise various situations.</i>		

Chart 3 – Mental processes that express the innovation of technologies in HC

Experiencer	Mental Process	Phenomenon	Circumstance	Code
I	think that (cognitive)	[to have innovations]	it would need [...] research aimed at this, innovations, technologies for the household, for the home patient, research, projects aimed at this area. [...] Not very expensive, because otherwise it ends up out of reality and it won't be a technology that will be used, that will enter	M2ST1
	would be good (perceptive)	if we [experiencer] had the possibility; if we could easily do imaging exams.	In case of rehabilitation of swallowing at home,	M4ST1
[I]	don't see (perceptive)	nothing	nowadays, there's no way.	
[Most patients here have sequelae of (CVA), for example, many also of head trauma, which for some reason have paraplegia] – Circumstance	so, if it had (desiderative)	This [elevating crane] for the patient, would make the work easier, would give more autonomy to the patient, because the patient could do everything with the crane on his own, he would have much more autonomy.	but, unfortunately, it's very expensive.	M3OT1
I	think today, I believe (cognitive)	that already has very good technology support for home care.	Unfortunately, however, for the SUS, for the social conditions of our patients, there are still things that are lacking. But on the other hand, we have a Trilogy, which costs 40 thousand BRL, which a lot... doesn't even have a plan and that the service offers. Oxygen therapy is also very expensive. That hub SUS offers, got it?	(M1N2)
We	are managing	to take this [fan] home.	Because until recently, it was only for restricted use	(M3PH2)

Chart 3 – Cont.
Source: Research data, 2020.

Circumstance	Actor	Process	Goal, scope or beneficiary affected by process	Code
<i>I need spatulas,</i>	<i>the city hall</i>	<i>does not make these things available to us,</i>	<i>we work with a spoon instead of a spatula.</i>	(M2ST1)
	<i>I</i>	<i>took</i>	<i>the ceiling fan, put a wire and adapted the serum support there. Tall, with gravity, to be gravitational.</i>	(M1N2)
<i>Sometimes a gastrostomy, at night that</i>	<i>the patient</i>	<i>loses</i>		(M1N2)
	<i>or the balloon</i>	<i>deflates,</i>	<i>we have to improvise, because when you try to reintroduce it, sometimes you can't. Then what do you do? Pass a Foley catheter into a gastrostomy. This is an improvisation, understand?</i>	
<i>You see it's a bedside nail routine for patients in our Program</i>		<i>very practiced.</i>	<i>It's an adaptation, right?!</i>	(M1N4)
<i>The patient has asbestos tile ceiling.</i>	<i>He</i>	<i>put</i>	<i>Styrofoam plate on the ceiling, above the patient,</i>	(M1N4)
		<i>put</i>		
<i>[because it wasn't too hot]</i>	<i>Then, he</i>	<i>he took the wood, put it on the wire and tied the electric heater</i>	<i>Styrofoam plates on the ceiling to acclimatize the environment</i>	

Chart 4 – Material processes on creating and transforming technologies in HC

Source: Research data, 2020.

DISCUSSION

The findings of the study allowed us to identify that there is a representation of technologies in HC from the functional discourse that indicates the use and role of technologies in work and in health care. It also identifies the economic-financial discourse that reveals the lack of investment for technological incorporation and, consequently, the need to invent and innovate to support practices in HC. It is noticed, therefore, the contradictions between innovating, inventing and investing as a representational meaning of technologies in HC.

The discourses, analyzed from the elements of relational processes; mental processes and material processes⁽¹⁰⁻¹¹⁾, inform the meaning of the technologies associated with its role as a mediator of human work to improve care, emphasizing the causes and reasons for its use in HC. It is evident the material character of the technologies, characteristic of the technological composition of the hospital-centered model with few elements that indicate the substitutivity in health practices⁽⁵⁾.

The notion of technology as “thing” indicates a materialization process of something to be used, a palpable artifact and, from the perspective of the participants, are “new things”

that imprint a character of innovation beyond the “usual, the standardized”.

Novelty as an attribute of technologies is represented, in the participants’ discourses, as the incorporation of products and equipment that already exist and are widely used in other care spaces or for other purposes. Thus, the discourses do not portray innovation per se, but reveal a delay in delivering certain inputs for HC, a modality considered by the study participants as innovative in health care. At the same time, this finding reinforces the characteristics of the hospital-centered model⁽⁵⁾ by associating, contradictorily, the new with the use of equipment (mechanical ventilator and oxygen concentrator) or operating systems, without, however, recognizing that the novelty of HC is due to the substitutive character of their practices as non-material technologies. Thus, the hegemony of the hospital-centered model, centered on equipment, is contained in the discourse and is reproduced in social practices.

Invention, as the act of recomposing instruments or devices⁽⁴⁾, is a finding identified in the study and the reports exemplify and justify the “improvements” as constant inventions in the context of HC. In general, these improvisations are consequences of the lack of resources that lead teams and caregivers to replace equipment or supplies with something similar, with a view to continuing patient care.

Contradictorily, inventions and investments are intrinsically related in HC. Under this analysis, it is identified that adaptations and improvisations in HC have a dialectical conjugation between insufficient resources and the need for creation to guarantee the provision of care⁽¹²⁾. In this relationship, on the one hand, the aim is to ensure assistance, but on the other hand, absences occur with repercussions on working conditions and care itself. The inexistence or non-availability of inputs and certain technologies mobilizes teams and families in a process of inventiveness in the act of caring, constituting a contradiction.

In HC, there is a plural and diversified work environment for experiencing situations that awaken creative processes with the intention of producing something new, which did not exist in that reality. In this context, inventiveness is an important technological value in HC work, both for the professional, as well as for the caregiver and the user⁽⁸⁾.

The inventive process is fed by will and knowledge that culminate in the creation of a certain product or technology, motivating subjects to improve their results in a simplified way⁽¹³⁾. In the case of HC, the findings point out that motivation comes from the desire to “make life easier and improve care”, indicating an aspect of substitutivity in this care modality by incorporating material technologies and creating or adapting devices in the home.

However, creations do not always seem to be safe. The adaptations and improvisations identified in the study can impose risky situations for patients, caregivers and professionals. This problem is expressed, contradictorily, in a naturalized discourse that rationalizes the description of unsafe creations without contesting the risks in this process. Thus, the findings show the effects of lack of investment on care, the beneficiary of assistance or the scope of practice and inform the adaptations and improvisations resulting from the unavailability of basic inputs for care at home. Investment in technologies is essential for the future of HC⁽¹⁴⁾.

It is understood that the scarcity of resources and the lack of investments to offer technologies that already exist and applied in other spaces are the causes for improvisation in HC. Improvisations can be understood as inventions since they start from pre-existing inputs, artifacts or devices⁽⁴⁾ changing their function to facilitate or provide the execution of care.

It is important to highlight that inventions, adaptations and improvisations are produced in a context of insufficiency or non-prioritization of investments. Thus, it is not a question of the lack of technology or resources in the health system, but of its non-availability for assistance at home. It is suitable to do the best possible in a scenario of recognition of the lack of resources for home care. Thus, it is reinforced the need for technological investment in this scenario⁽¹⁴⁾.

It is known that economic-financial interests direct funding to certain sectors, areas, policies and levels of technological density and complexity, always applying resources to the high cost of procedures or equipment. With this, other levels of the system persist with low investments, which reveals an unequal and contradictory distribution of financial, material and human resources with a concentration in medium and high complexity, especially in services with intensive use of technological devices⁽¹⁵⁾. On the other hand, other services are affected by a lack of investments, which leads to insufficiency of inputs, precariousness and subjective consequences for the actors involved in this process^(16,17).

The pressure of the medical-pharmaceutical industry also exerts great power in the application of resources and, consequently, a care model is established that emphasizes curative actions, treatment of diseases, injuries and damages and the intensive use of technological device of the material type⁽¹⁸⁾. In order to overcome the hospital-centered biomedical model and implement new care models, it is necessary to overcome the challenges in the daily life of health services, including accumulated knowledge and available technologies for care, funding and the guiding values of workers and users⁽¹⁸⁾.

It is also necessary to recognize that the definition of a new care model depends on the innovation in the technological

composition that applies to the care process, breaking with the high consumption of material technologies to make room for the predominance of relational technologies⁽⁵⁾. This seems to be a contradictory aspect in the findings: despite the normative premises of HC as a substitute care modality, there is a tendency to reproduce the hospital-centered logic based on the consumption of high-density technological equipment, such as those for recognition and appreciation in the professionals' discourse.

Therefore, the findings indicate that the substitutive technological composition in HC has an inventive potential in the act of caring revealed by the creations and adaptations produced in the participation and preparation of families. However, it was demonstrated as strong evidence the predominance of the hegemonic hospital-centered model represented by the discursive valuation of technologies in their material meaning crossed by economic determinants.

Invention, innovation and investments are opposed in the technological conformation of HC. There is, on the one hand, the absence of technological innovations resulting from the low investment in this type of care modality⁽¹⁸⁾. On the other hand, inventions triggered by families or professionals to support home care are identified⁽⁸⁾. These inventions, given their precariousness, conform as improvisations and adaptations that, contradictorily, can compromise care. Added to this process is the prioritization of investments in resources and equipment of high technological density that reinforce the hospital-centered logic⁽⁵⁾ while there is lack of basic inputs for care.

Thus, the results of the study point out to the need to overcome these contradictions with the definition of political, institutional and economic-financial priorities in order to make available all the technological inputs necessary for home care with a reversal of the hegemonic technological composition represented in the participants' discourse. This need is in line with the imperative to reduce the transfer of responsibilities to families that develop their own coping strategies⁽¹⁹⁾ in view of the low investments in HC.

In other contexts, the concern with the costs related to the use of technologies in the home is identified, revealing that this application can be economical, but that it should be carefully performed to maximize the efficiency of high-tech care at home^(14,20)

It is recommended that creations or adaptations in the home environment should not be the responsibility of professionals and families. It is necessary to include and involve managers and other actors to forecast expenditures and provide material resources in adequate quantity and quality for the development of work in HC. Thus, professionals will be

able to use their creative potential to invent and qualify care in a composition that values non-material technologies⁽⁵⁾.

■ CONCLUSION

It is concluded that there are contradictions between innovation, inventions and investments in technologies in the context of HC. In this care modality, the insufficiency of resources for the acquisition of necessary technologies for basic care and the inventions produced by families and professionals coexist dialectically.

Still, it is identified that the novelty character is attributed to the availability of equipment with high technological density, especially the use of mechanical ventilation and oxygen concentrator in homes. In this way, home care technologies are represented by professionals as a material apparatus, a symbol of the biomedical model.

There is an important challenge to overcome the dominant perspective of investment and centrality in high-cost technologies in HC to a model that incorporates other technological forms of providing care.

We recognize, as limitations of the study, that the inclusion of other participants such as managers and family members could add new perspectives on the topic discussed here. The observation of the work processes established by these participants could also complement the findings of the study.

■ REFERENCES

1. Rajão FL, Martins M. Home care in Brazil: an exploratory study on the construction process and service use in the Brazilian Health System. *Ciênc Saúde Colet*. 2020;25(5):1863-76. doi: <https://doi.org/10.1590/1413-81232020255.34692019>.
2. Rodrigues AMM. Por uma filosofia da tecnologia. In: Grinspun MPSZ, organizadora. *Educação tecnológica: desafios e perspectivas*. 3. ed. São Paulo: Cortez; 2009.
3. Lima AA, Jesus DS, Silva TL. Densidade tecnológica e o cuidado humanizado em enfermagem: a realidade de dois serviços de saúde. *Physis*. 2018;28(3):e280320. doi: <https://doi.org/10.1590/s0103-73312018280320>.
4. Descritores em Ciências da Saúde: DeCS [Internet]. São Paulo: BIREME/PAHO/WHO; 2021. [cited 2021 Jul 10]. Available from: https://decs.bvsalud.org/ths/resource/?id=55130&filter=ths_termall&q=inova%C3%A7%C3%A3o
5. Franco TB, Merhy EE. Cartografias do trabalho e cuidado em saúde. *Tempus*. 2012;6(2):151-63. doi: <https://doi.org/10.18569/tempus.v6i2.1120>.
6. Neves ACOJ, Castro EAB, Costa SRD. Needs for at-home nursing care after discharge from hospital in the SUS context. *Cogitare Enferm*. 2016;21(4):01-10. doi: <http://doi.org/10.5380/ce.v21i4.47708>
7. Pozzoli SML, Cecilio LCO. About caring and being cared for in home care. *Saúde Debate*. 2017;41(115): 1116-29. doi: <http://doi.org/10.1590/0103-1104201711510>.
8. Andrade AM, Silva KL. Adaptations and inventions in the praxis of nurses in home care: implications of the reflective practice. *Esc Anna Nery*. 2018;22(3):e20170436. doi: <https://doi.org/10.1590/2177-9465-EAN-2017-0436>.

9. Magalhães I, Martins AR, Resende VM. Análise de discurso crítica: um método de pesquisa qualitativa. Brasília: Editora UNB; 2017.
10. Salles HK, Dellagnelo EHL. A análise crítica do discurso como alternativa teórico-metodológica para os estudos organizacionais: um exemplo da análise do significado representacional. *Organ Soc.* 2019;26(90):414-34. doi: <https://doi.org/10.1590/1984-9260902>.
11. Fuzer C, Cabral SRS. Introdução à gramática sistêmico-funcional em língua portuguesa. Campinas: Mercado de Letras; 2014.
12. Andrade AM, Braga PP, Lacerda MR, Duarte ED, Borges Junior LH, Silva KL. Padrões do conhecimento que fundamentam a atuação de enfermeiras na atenção domiciliar. *Texto Contexto Enferm.* 2020;29:e20190161. doi: <https://doi.org/10.1590/1980-265X-TCE-2019-0161>.
13. Carvalho JD. A invenção dos objetos técnicos e a atividade artística: uma leitura de Gilbert Simondon. *Problemata.* 2017;8(2):5-18. doi: <https://doi.org/10.7443/problemata.v8i2.31049>.
14. Landers S, Madigan E, Leff B, Rosati RJ, McCann BA, Hornbake R, et al. The future of home health care: a strategic framework for optimizing value. *Home Health Care Manag Pract.* 2016;28(4):262-78. doi: <https://doi.org/10.1177/1084822316666368>.
15. Mazon LM, Colussi CF, Senff CO, Freitas SFT. Execução financeira dos blocos de financiamento da saúde nos municípios de Santa Catarina, Brasil. *Saúde Debate.* 2018;42(116):38-51. doi: <https://doi.org/10.1590/0103-1104201811603>.
16. Lima LSC, Souza NVDO, Gonçalves FGA, Pires AS, Ribeiro LV, Santos DM. Subjectivity of the nursing workforce and the practice of adapting and improvising material. *Cienc Cuid Saude.* 2016;15(4):685-62. doi: <https://doi.org/10.4025/ciencucidsaude.v15i3.31555>.
17. Santos DM, Souza NVDO, Franco VQ, Silva PAS, Gonçalves FGA, Pires AS. Os trabalhadores de enfermagem e a prática de adaptar e improvisar no ambiente hospitalar. *REAID.* 2019 [cited 2020 Dec 26];85(23):57. Available from: <https://revistaenfermagematural.com.br/index.php/revista/article/view/245>.
18. Fertoni HP, Pires DEP, Biff D, Scherer MDA. The health care model: concepts and challenges for primary health care in Brazil. *Ciênc Saúde Coletiva.* 2015;20(6):1869-78. doi: <https://doi.org/10.1590/1413-81232015206.13272014>.
19. Murphy A, McGowan C, McKee M, Suhrcke M, Hanson K. Coping with healthcare costs for chronic illness in low-income and middle-income countries: a systematic literature review. *BMJ Glob Health.* 2019;4(4):e001475. doi: <https://doi.org/10.1136/bmjgh-2019-001475>.
20. ten Haken I, Allouch SB, van Harten WH. The use of advanced medical technologies at home: a systematic review of the literature. *BMC Public Health.* 2018;18(1):284. doi: <https://doi.org/10.1186/s12889-018-5123-4>.

■ **Acknowledgments:**

To the *Fundação de Amparo à Pesquisa do Estado de Minas Gerais* (FAPEMIG) for funding the research, under process number APQ01010-15 with resources from the Research Program for the SUS (PPSUS).

■ **Authorship contribution:**

Conceptualization: Kênia Lara da Silva;
Formal analysis: Kênia Lara da Silva, Alexandre Ernesto Silva, Patrícia Pinto Braga, Lucas Frederico Luiz Lopes, Thiago de Medeiros Souza;
Funding acquisition: Kênia Lara da Silva;
Investigation: Kênia Lara da Silva, Alexandre Ernesto Silva, Patrícia Pinto Braga, Thiago de Medeiros Souza;
Writing-original draft: Kênia Lara da Silva, Alexandre Ernesto Silva, Patrícia Pinto Braga, Lucas Frederico Luiz Lopes, Thiago de Medeiros Souza;
Writing-review & editing: Kênia Lara da Silva, Alexandre Ernesto Silva, Patrícia Pinto Braga, Lucas Frederico Luiz Lopes, Thiago de Medeiros Souza;
Visualization: Kênia Lara da Silva, Alexandre Ernesto Silva, Patrícia Pinto Braga, Lucas Frederico Luiz Lopes, Thiago de Medeiros Souza.

The authors declare that there is no conflict of interest.

■ **Corresponding author:**

Kênia Lara da Silva
E-mail: kenialara17@gmail.com

Received: 01.10.2021
Approved: 08.11.2021

Associate editor:

Rosana Maffaccioli

Editor-in-chief:

Maria da Graça Oliveira Crossetti