Frailty and family functionality of older people in Home Care: an analytical cross-sectional study

Fragilidade e funcionalidade familiar de idosos da Atenção Domiciliar: estudo transversal analítico

Fragilidad y funcionalidad familiar de adultos mayores en la Atención Domiciliaria: estudio transversal analítico

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Abstract

Objective: To identify frailty prevalence and family functionality level in older people and analyze the association of these variables with sociodemographic characteristics and with access to health care services for older people linked to Home Care type 1 in Primary Health Care.

Methods: This is an analytical cross-sectional study, carried out through home care visits, from October 2018 to April 2019, with 124 older people aged 60 years or older, linked to Home Care type 1 in a health district in Porto Alegre. The Edmonton Frail Scale, the family APGAR and the sociodemographic data and access to health care service questionnaire were used. Student's t test, Mann-Whitney test, chi-square test, Fisher's exact test and Poisson regression model were applied in the statistical analysis. A significant value $p<0.05$ was considered.

Results: Frailty prevalence was 75%, and 84.7% of the older adults had a good family functionality level. Frailty had a statistically significant association, with a higher age group ($p=0.009$), a high average number of morbidities ($p=0.027$), presence of a caregiver ($p<0.001$), not living alone ($p<0.001$), cognitive decline ($p<0.001$) and exclusively home care ($p<0.001$). Family functionality did not show a statistically significant association with the variables under study.

Conclusion: There was a high frailty prevalence and good family functionality. Only frailty was significantly associated with some of the variables under study. Knowing this specific population is essential so that interventions can be developed, ensuring access to health care services.

Resumo

Objetivo: Identificar a prevalência da fragilidade em idosos e o nível de funcionalidade familiar e analisar a associação dessas variáveis com características sociodemográficas e com o acesso aos serviços de saúde de idosos vinculados à Atenção Domiciliar tipo 1 da Atenção Primária à Saúde.

Métodos: Estudo transversal analítico, realizado por meio de visitas domiciliares, de outubro de 2018 a abril de 2019, com 124 idosos de 60 anos ou mais, vinculados à Atenção Domiciliar tipo 1 de um distrito sanitário de Porto Alegre. Utilizaram-se a Escala de Fragilidade de Edmonton, o APGAR da família e o questionário de dados sociodemográficos e de acesso ao serviço de saúde. Aplicaram-se o teste *t* de Student, o teste de Mann-Whitney, o teste do qui-quadrado, o teste exato de Fisher e o modelo de regressão de Poisson na análise estatística. Foi considerado como valor significativo $p<0,05$.

Resultados: A prevalência de fragilidade foi de 75%, e 84,7% dos idosos apresentaram bom nível de funcionalidade familiar. A fragilidade apresentou associação estatisticamente significativa, com maior faixa etária ($p=0,009$), elevado número médio de morbidades ($p=0,027$), presença de cuidador ($p<0,001$), não

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morar sozinho (p<0,001), défice cognitivo (p<0,001) e com forma de atendimento exclusivamente domiciliar (p<0,001). A funcionalidade familiar não apresentou associação estatisticamente significativa com as variáveis em estudo.

Conclusão: Houve alta prevalência de fragilidade e de boa funcionalidade familiar. Apenas a fragilidade esteve associada significativamente com algumas das variáveis em estudo. Conhecer essa população específica é imprescindível para que intervenções possam ser desenvolvidas, garantindo acesso aos serviços de saúde.

Resumen

Objetivo: Identificar la prevalencia de la fragilidad en adultos mayores y el nivel de funcionalidad familiar y analizar la asociación de esas variables con características sociodemográficas y con el acceso a los servicios de salud de adultos mayores vinculados a la Atención Domiciliaria tipo 1 de la Atención Primaria a la Salud.

Métodos: Estudio transversal analítico, realizado por medio de visitas domiciliarias, de octubre de 2018 a abril de 2019, con 124 adultos mayores de 60 años o más, vinculados a la Atención Domiciliaria tipo 1 de un distrito sanitario de Porto Alegre. Se utilizó la Escala de Fragilidad de Edmonton, el APGAR de la familia y el cuestionario de datos sociodemográficos y de acceso al servicio de salud. Se aplicaron la prueba *t* de Student, la prueba de Mann-Whitney, la prueba chi cuadrado, y la prueba exacta de Fisher y el modelo de regresión de Poisson en el análisis estadístico. Se consideró valor significante p<0,05.

Resultados: La prevalencia de fragilidad fue de 75 % y el 84,7 % de los adultos mayores presentaron un buen nivel de funcionalidad familiar. La fragilidad presentó una asociación estadísticamente significante, con mayor grupo de edad (p=0,009), elevado número promedio de morbilidades (p=0,027), presencia de cuidador (p<0,001), no vivir solo (p<0,001), déficit cognitivo (p<0,001) y con forma de atención exclusivamente domiciliaria (p<0,001). La funcionalidad familiar no presentó asociación estadísticamente significante con las variables en estudio.

Conclusión: Hubo una alta prevalencia de fragilidad y de buena funcionalidad familiar. Apenas la fragilidad estuvo asociada significantemente con algunas de las variables en estudio. Conocer a esa población específica es imprescindible para que se puedan desarrollar intervenciones, garantizando el acceso a los servicios de salud.

Introduction

Caring for an increasingly aging population, due to the rapid demographic transition worldwide, is a major challenge.[1] In physiological aging, there is a gradual and progressive functional loss, which does not cause disability, but which results in limitations for the older person.[2] Some of these losses can be more expressive and grouped, characterizing the frailty syndrome,[2] which, in turn, contributes to the increased risk of falls, hospitalization, disabilities, institutionalization, dependence and death.[2,3]

The advance of frailty in older people implies the need for support from caregivers, arrangements in the environment's physical structure and availability of time and knowledge for care necessary for this population.[4] Thus, considering that older adult care is often provided by family members, which can have an impact on family arrangement, it is important to know how family dynamics occur, i.e., the older adult's family functionality level. Family functionality is understood as the way in which it is able to fulfill and harmonize essential functions, in an appropriate way to the identity and relationships of families and their members, being realistic about the challenges that affect the family unit.[5]

Thus, frailty and family functionality are important aspects when the nurse performs the older adult's health assessment, because, knowing that older people are major users of health care services, care must be focused on welcoming and offering comprehensive and continuous care.[6] For older people in clinical stability, who need health care in a situation of restriction at home, temporarily or permanently, or in a degree of vulnerability, the Unified Health System (SUS - *Sistema Único de Saúde*) is offered Home Care type 1 (HC1), under the responsibility of Primary Health Care (PHC).[7] HC1 is aimed at users who have controlled health problems and need less frequent care, as well as who have some difficulty or physical impossibility of moving to a health care service.[7] With an increasing demand for health care services by the older population, it is important to know the health care models that respect the older adult's characteristics, with comprehensive care throughout the care path.[8]

Considering that family functionality, frailty and access to health care services are conditions inherent to the work performed by nurses in home care services, the importance of this professional in consolidating the care provided in an effective and resolute manner is highlighted. Furthermore, the older population demands a more targeted and specialized care from nursing, due to its particularities.[9]

There are gaps in the literature regarding the relationship between frailty and family functionality and access to health care services. Studies have focused on these themes with older people in the community, but without any association with access to health care services.[3,10] In this regard, the data found in this research can guide the prioritization and implementation of interventions and improvements in the care provided.

This study aimed to identify frailty prevalence in the older population and family functionality level and analyze the association of these variables with sociodemographic characteristics and with access to health care services for the older adult linked to PHC HC1.

Methods

This is an analytical cross-sectional study with older people linked to PHC HC1 in a health district in the city of Porto Alegre, southern Brazil, which was divided into 17 health districts. Data collection was carried out from October 2018 to April 2019.

The total population of older adults linked to HC1 in the district was 227 individuals. To calculate the sample size, WinPepi, version 11.65, was used. Considering a minimum correlation of 0.25 between the frailty and family functionality scales with the frequency of access to health care services, 5% significance and 80% statistical power, the result was a sample of 124 subjects.[11-13] Users were identified through lists made available by the health care services, which contained their full name, address and telephone number.

Older people aged 60 years or older, linked to HC1 in that district, were included in the study. Older people who were not located after three attempts to make contact by phone, on different shifts and days, or who were not at home after an attempt at home care visit without verbal or written communication skills, with a previous medical diagnosis of advanced dementia (informed by caregiver/family member or team professional) and institutionalized, due to access and continuous care of health professionals, were excluded. Individuals who met the inclusion criteria were contacted by telephone to schedule the interview at home, or an attempt was made to make a home care visit if telephone contact was not possible.

Data collection was carried out through structured interviews in the older adult's homes, conducted by graduate nurses and undergraduate nursing students. The version of the Mini Mental State Examination adapted and validated for use in Brazil was applied[14] using the following cut-off points: 13 for illiterate, 18 for elementary and middle school and 26 for secondary education. When the score was less than or equal to 13, the caregiver/family member who was accompanying the older person was invited to help answer the instruments.

In addition to this, a questionnaire prepared by the researchers was applied, containing sociodemographic data (birthday, biological sex, education, source of income, marital status and number of individuals living in the household), morbidities and access to health care services - the latter was assessed through the offer characteristics, which facilitate or hinder the use of these services,[15] i.e., the possibility of using the services by the older person was considered, in order to meet the individual's needs. Thus, the following questions were used to assess access to health care services: Do you have a health plan? When you need assistance, what form do you use? How often do you receive home care visits?

The Edmonton Frail Scale, adapted and validated version for use in Brazil,[16] was used to assess frailty. This scale is composed of nine domains: cognition, general health status, functional independence, social support, medication use, nutrition, mood, continence and self reported performance. The final scores for the frailty analysis are from zero to four if not frail, five to six if apparently vulnerable, seven to eight if mildly frail, nine to ten if moderate frailty and 11 to 17 if severe frailty.[17] For this study, cut-off points from zero to six for non-frail and from seven to 17 for frail were used.[13]

The Family APGAR instrument, adapted and validated for use in Brazil, was applied to assess family functionality.[18] It is an acronym that evaluates adaptability, partnership, growth, affection and resolve. These items are evaluated through five sim-

ple questions, with answer options: "almost always (2)", "some of the time (1)" and "hardly ever (0)". Cut-off points from zero to six (presents family dysfunction) and seven to ten (presents good family functionality) were used.[19]

Researchers were previously trained, and all interviews were conducted by two researchers. Double data entry was performed in the Excel program, then the data were transported and analyzed in Statistical Package for the Social Sciences, version 21.0.

The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) [20] recommendations were used to support the study rigor and describe all the necessary elements.

To compare the means of variables of interest, Student's t test and, in case of asymmetry, the Mann-Whitney test were applied. The chi-square test or Fisher's exact test was performed to compare ratios. To control for confounding factors, Poisson regression model was applied. All variables that presented $p<0.20$ in the bivariate analysis were included in the multivariate model. Associations that presented $p<0.05$ were considered statistically significant.

The study was approved by the Research Ethics Committees of the *Hospital de Clínicas de Porto Alegre* (Opinion 2.740.678) (CAAE (*Certificado de Apresentação para Apreciação Ética* - Certificate of Presentation for Ethical Consideration) 90632418.3.0000.5327) and by the Municipal Health Department of Porto Alegre (Opinion 2.900.696) (CAAE 90632418.3.3001.5338)).

Results

There was a predominance of frail older adults, accounting for 75% of the sample. Regarding family functionality, most (about 85%) had good functionality. According to Table 1, there was a statistically significant association between the following variables with frailty: age group 85 years or older, presence of caregiver, not living alone, receiving exclusive home care visits as a form of care and presenting cognitive decline.

The group of frail older adults presented a higher number of morbidities. Also, when individual morbidities were evaluated, those that were significantly associated with the presence of frailty were Parkinson's disease (100% frail; p=0.037), dementia (95% frail; p=0.048) and depression (88.4% frail; p=0.022). Most of frail older adults had good family functionality. Regarding family functionality, it was observed that the younger, female, retired older adult, who did not live alone, without cognitive decline and who received exclusive home care visits as a form of care had a higher percentage of family dysfunction. However, only the variables related to the receipt of benefit and having supplementary health insurance, when analyzed in the multivariate model with family functionality, presented a statistical association borderline, respectively, of p=0.073 and p=0.051. In Table 2 it is possible to observe that, after multivariate analysis, the older adult who did not live alone had more than twice the chance of presenting frailty.

Figure 1 shows the average distribution of the Edmonton Frail Scale related to the form of care used by the older adult in the study. The mean score of the frailty scale was 8.7 points among the older adult who received exclusive home care visits, while among the older adult who also had other forms of access, it was 6.7 points (p=0.001).

Discussion

There was a predominance of frail older adult (75%), diverging from another Brazilian study, which used the same scale to assess the frailty of older adults (60 years or older) registered in a Family Health Unit in João Pessoa (PB, Brazil), which found a prevalence of 39.6% of frail older adult.[21] Such differences can be explained by the particular sample characteristics, in addition to the different sociocultural contexts. In this study, the older population was specific to those accompanied by HC1, and among its characteristics is the difficulty in accessing the health care service, which can justify a high number of frail individuals, being, therefore, higher when compared to all older adults registered in a PHC.

Table 1. Associations between sociodemographic variables, access to health care services and cognition with family functionality and older adult frailty

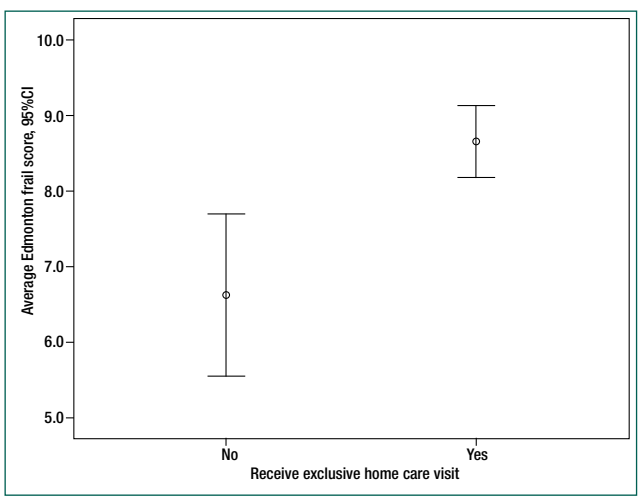
Variables	Frailty			Family functionality		
	Not frail (n=31) n(%)	Frail (n=93) n(%)	p-value	Good functionality (n=105) n(%)	Family dysfunction (n=19) n(%)	p-value
Age group, years			0.009*			1.000*
60-84	24(77.4)	45(48.4)		58(55.2)	11(57.9)	
≥85	7(22.6)	48(51.6)		47(44.8)	8(42.1)	
Female	23(74.2)	71(76.3)	1.000*	79(75.2)	15(78.9)	1.000*
Education level, years			0.659*			0.283*
0-4	12(38.7)	44(47.3)		46(43.8)	10(52.6)	
5-8	11(35.5)	26(28.0)		30(28.6)	7(36.8)	
>8	8(25.8)	23(24.7)		29(27.6)	2(10.5)	
Income source						
Retirement	27(87.1)	72(77.4)	0.366*	82(78.1)	17(89.5)	0.359*
Benefit	7(22.6)	29(31.2)	0.493*	34(32.4)	2(10.5)	0.098*
Family help	3(9.7)	24(25.8)	0.102*	21(20.0)	6(31.6)	0.363*
Marital status			0.412*			0.242*
Married/with partner	8(25.8)	25(26.9)		28(26.7)	5(26.3)	
Single	7(22.6)	16(17.2)		18(17.1)	5(26.3)	
Divorced/separated	4(12.9)	5(5.4)		6(5.7)	3(15.8)	
Widow	12(38.7)	47(50.5)		53(50.5)	6(31.6)	
Number of morbidities	2(2-3)	3(2-4)	0.027†	3(2-4)	2(2-4)	0.952†
Presence of a caregiver	7(23.6)	70(75.3)	<0.001*	67(63.8)	10(52.6)	0.505*
Live alone	14(45.2)	6(6.50)	<0.001*	15(14.3)	5(26.3)	0.190*
Cognitive decline	5(16.1)	56(60.2)	<0.001*	53(50.5)	8(42.1)	0.673*
Frequency of home care visits			0.056‡			0.604*
< once a month	2(6.5)	21(22.6)		18(17.1)	5(26.3)	
Once or more a month	15(48.4)	47(50.5)		54(51.4)	8(42.1)	
When requested	14(45.2)	25(26.9)		33(31.4)	6(31.6)	
Have health insurance	13(41.9)	45(48.4)	0.678*	53(50.5)	5(26.3)	0.091*
Form of service						
Exclusive home care visit	14(45.2)	76(81.7)	<0.001*	77(73.3)	13(68.4)	0.871*
Commute to work	17(54.8)	17(18.3)	<0.001*	28(26.7)	6(31.6)	0.871*
APGAR‡ good family functionality	27(87.1)	78(83.9)	0.780*	-	-	-

Results expressed as n (%) or median (percentiles 25-75); *Chi-square test; † Mann-Whitney test; ‡ Fisher's exact test
APGAR - acronym for Adaptability, Partnership, Growth, Affection and Resolve

Table 2. Multivariate Poisson regression analysis to assess factors independently associated with frailty

Variables	Prevalence ratio (95%CI)	p-value
Age group, years		
60-84	1.00	
≥85	1.24 (1.04-1.47)	0.014
Number of morbidities	1.05 (0.99-1.09)	0.055
Live alone		
Yes	1.00	
No	2.19 (1.11-4.31)	0.023
Cognitive decline		
With	1.37 (1.12-1.68)	0.002
Without	1.00	
Form of care - exclusive home care visit		
Yes	1.36 (1.01-1.85)	0.045
No	1.00	

95%CI - 95% Confidence Interval



95%CI - 95% confidence interval

Figure 1. Distribution of the average Edmonton Frail Scale score, according to access to health care services, through exclusive or non-exclusive home care visits

Thus, it emphasizes the importance of identification and treatment of frailty being incorporated as standard practice in PHC and, consequently, in home care services, and specific programs can be used to monitor and manage it.[22]

Regarding family functionality, most older people showed good functionality, which is related to the ability to adapt and maintain affective relationships and the ability of members to solve problems.[23] A study carried out in Minas Gerais (Brazil) using the APGAR scale with older people in the community showed similar results, with a percentage of functionally satisfactory families of 76.3%.[10] This finding is important for preparing a care plan for older people by nurses, as families plays a valuable role in supporting and caring for older people; good family functionality can reflect the success and effectiveness of a care plan. Furthermore, a multicenter, cross-sectional study carried out in Portugal with 521 primary care patients with multimorbidity, which also used the APGAR scale, identified that 70.4% of the families were highly functional.[24] Furthermore, patients with a high morbidity count (six or more chronic diseases) had a slightly higher perception of having a dysfunctional family, which may justify the sample's good family functionality, since the number of morbidities among the older adults was relatively low, with a prevalence ratio of 1.05 (ranging from 0.99 to 1.09).[24]

An adequate family arrangement can imply a better quality of life for the older adult, showing how significant family interactions, their organization, support and understanding by health professionals are.[19,25] Frail older people, for example, demand care from their family, which impacts on family dynamics and, therefore, on intrafamily relationships.[18] In the present study, family functionality was not statistically significantly related to the other variables, which can be justified by the possibility that the older adult feel uncomfortable in answering negatively to questions about the people who take care of them, being more tolerant with the family for thinking that it is difficult to take care of them and also because of their own cognitive performance. Older people accompanied by HC1 probably have a significant percentage of good family functionality, as one of the criteria for being registered in this modality is that the older person has a responsible family member. Another aspect that may be associated with this finding is that the actions of HC1 include educational guidelines for the family, involving them in both physical and emotional care for the older person.

As for factors significantly associated with frailty, the high age group (≥85 years) and the presence of a caregiver stand out. Evidence has been found in the literature that frailty prevalence increases with age.[26,27] Regarding the presence of a caregiver, frail older people demand more care and help in carrying out Activities of Daily Living, therefore, they may need a caregiver.[13] In addition to this, this can help nurses engaging with care and aiming at a better quality of life for the older adult.[6,10] The training of caregivers by nursing is essential for them to be able to support the older adult in different situations, including the early identification of signs of frailty, and know how to intervene.

Living alone was also associated with a lower level of frailty. Older people who lived alone were less frail, i.e., they lived alone possibly because they had better health conditions. A systematic review and meta-analysis of 203 studies identified a significant cross-sectional association between living alone and frailty.[28] However, when performing an analysis stratified by gender, the review study showed that only male who live alone are at increased risk of being frail, while female do not.[28] Thus, it can be inferred that the data by gender in the review are similar to those in this study, in the sense that most of the sample in the present investigation consisted of women. It is also worth mentioning that the authors of the systematic review and meta-analysis point out that the mechanisms to which living alone and frailty are associated are not known.[28] What is known is that older people who live alone are at greater risk of isolation, loneliness and depression. Thus, social frailty increases the chances of developing physical frailty.[29]

Frailty is due to some factors, which are biological, psychological, cognitive and social, which result from the physiological aging process and the presence of

pathologies.[3,30] From this perspective, in this study, older people with a greater number of morbidities were more likely to develop frailty, which is in line with the finding of another study.[26] Furthermore, in this study, a greater number of morbidities was positively associated with frailty. Parkinson's disease, dementia and depression were the diseases that were positively associated. This finding highlights the need for nursing interventions aimed at preventing cognitive and emotional illnesses and how this topic, which is so important to older people's mental health, should be addressed. A study carried out in Minas Gerais (Brazil) with 360 older people also showed a statistical association (p=0.00) between depression and frailty presence using the Edmonton Frail Scale.[31] A study carried out in Pelotas (RS, Brazil) showed an association between frailty presence and Parkinson's disease (p=0.007),[26] and a cohort study with 150 patients over 80 years of age conducted in England also identified an association between frailty, verified by the Edmonton Frail Scale, with high coexistence of comorbidities (p=0.005), especially coronary heart disease (p=0.02).[32] Hypertension, despite being the most prevalent disease in the studied sample, had no statistical significance when associated with frailty, unlike a study carried out with older people in a geriatric and gerontology clinic in the Brazilian Federal District, which showed an association between hypertension and the highest risk to present frailty.[27]

The application of the Mini Mental State Examination indicated that most frail older people also had a cognitive decline, corroborating a finding in the literature.[33] A study carried out in a rural area of Ecuador with 252 older people (60 years old or older) using the Edmonton Frail Scale, to assess frailty, and the Montreal Cognitive Assessment, to assess cognitive decline, reinforced the relationship between the two variables.[34] Once again, the need for early intervention is highlighted through preventive actions against the decline in the functional cognition system, such as encouraging reading and social interaction, performance of occupational therapeutic activities and physical activity, periodic assessments by the team, among others actions, aiming to avoid frailty.

Adherence to a health plan and the frequency of home care visits did not show a significant association with frailty. However, the exclusive home care visit as a form of care was associated with frailty. This is because the most frail older adults, for the most part, only received home care visits as a form of care, confirming literature data according to which frail older people demand more care from health care services, and home care visits are a type of care that facilitates individuals' access to health.[30,35] Thus, it emphasizes the importance of professional training based on the needs of the population that will be met, aiming at older people's promotion, prevention, treatment and rehabilitation.

Still, a gap was found in the literature on studies that addressed the number of home care visits that the older people receive from health professionals when linked to home care services of PHC. The ordinance that redefines home care services within the SUS[7] does not establish the number of visits for HC1. However, this is an important fact to be studied, in order to understand if those who most need care is being prioritized in health care services, carrying out interventions when necessary and avoiding the worsening of health problems and hospitalizations.

This research provides support for professionals working in HC1 on the need to identify frailty prevalence and family functionality level. Based on this information, a care plan can be drawn up with the aim of delaying the onset or minimizing frailty, in addition to intervening in associated factors. Moreover, this study guides the creation of interventions and improvements in the care provided to older people and their caregivers/relatives.

The limitations of this study are related to the specific population, which did not allow the generalization of results, and the fact that it is a cross-sectional study, and it is not possible to establish cause-and-effect relationships.

Conclusion

Most of the older people in the sample were frail and had good family functionality. Receiving an ex-

clusive home care visit as a form of care was significantly associated with frailty. Family functionality did not present a statistically significant association with the analyzed variables. Frailty was associated with older age, number of morbidities, presence of caregiver, living alone and presence of cognitive decline. HC1 has strategic potential, as it identifies needs early and strengthens the bonds and the formal and informal support network, expanding access to health within PHC. Therefore, knowledge about the characteristics and context in which the older population and their caregivers are inserted becomes essential as HC1 team can assess and monitor these subjects, implementing interventions aimed at this population and, consequently, ensuring early, effective and quality care.

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