In-hospital treatment of cervical cancer in minas gerais in 2021 – time series from 2012 to 2021

Tratamento hospitalar do câncer do colo do útero em minas gerais em 2021 – série temporal de 2012 a 2021

Tratamiento hospitalario del cáncer cervical en Minas Gerais en 2021 – serie temporal de 2012 a 2021

RESUMO

O câncer do colo do útero (CCU) é o terceiro tumor mais comum na população feminina. Devido à importância de sua morbimortalidade, políticas públicas de saúde vêm sendo desenvolvidas no Brasil desde meados da década de 1980. É decisiva a detecção de lesões em estágios iniciais para o prognóstico e conduta a ser adotada, de modo que lesões em estágio mais avançado, geralmente necessitam de procedimentos mais invasivos e internações hospitalares. Apesar das medidas de prevenção e controle adotadas atualmente, é importante monitorar as taxas de prevalência de procedimentos hospitalares para o câncer do colo do útero e sua letalidade, com o objetivo de contribuir para o planejamento de ações de prevenção. OBJETIVO: Descrever a frequência de procedimentos hospitalares por CCU em Minas Gerais e observar sua tendência de 2012 a 2021. MÉTODOS: O presente trabalho consiste em um estudo descritivo, ecológico e observacional dos procedimentos hospitalares para CCU em Minas Gerais em 2021; e estudo analítico de 2012 a 2021. RESULTADOS E DISCUSSÃO: Em Minas Gerais em 2021 foram realizados 2.122 procedimentos hospitalares por CCU. A faixa etária mais comum foi de 35 a 44 anos, seguida por 45 a 54 anos. Do total de procedimentos, as internações hospitalares para tratamento de pacientes oncológicos foram as mais frequentes, seguidas de outros dois procedimentos clínicos. A análise desta série temporal mostrou uma diminuição significativa quando os procedimentos foram observados globalmente (todas as faixas etárias) e para pessoas de 35 a 44 anos e de 45 a 54 anos. CONCLUSÃO: Apesar da tendência de melhoria de alguns indicadores, ao observar esta série histórica, esses indicadores precisam ser monitorados continuamente para que sejam verificados os reais impactos das ações propostas para melhoria do cenário geral, e principalmente das faixas etárias que não apresentaram taxas reduzidas. As intervenções devem ser consideradas não apenas na saúde, mas também aquelas que abrangem indicadores socioeconómicos e humanitários.

DESCRITORES: Epidemiologia. Procedimentos Hospitalares. Câncer cervical. Análise de Tempo.

ABSTRACT

Cervical cancer (CC) is the third most common tumor in the female population. Due to the importance of its morbimortality, public health policies have been developed in Brazil since the mid-1980s. It is decisive to detect lesions in early stages for the prognosis and conduct to be adopted, so that lesions in a more advanced stage usually require more invasive procedures and hospital admissions. In spite of prevention and control measures currently adopted, it is important to monitor prevalence rates of hospital procedures for cervical cancer and its lethality, with the purpose of contributing to the planning of prevention actions. OBJECTIVE: To describe the frequency of hospital procedures for CC in Minas Gerais, and to observe their trend from 2012 to 2021. METHODS: The present work consists of a descriptive, ecological, observational study of hospital procedures for CC in Minas Gerais in 2021; and an analytical study from 2012 to 2021. RESULTS AND DISCUSSION: In Minas Gerais in 2021, 2,122 hospital procedures were performed due to CC. The most common age group was from 35- to 44-year-olds, followed by 45- to 54-year-olds. Of the total number of procedures, hospital admissions to treat cancer patients was the most common one followed by two other clinical procedures. The analysis of this time series has shown a significant decrease when procedures were observed globally (all age groups) and for 35-to-44-year-olds and 45-to-54-year-olds. CONCLUSION: In spite of the improvement trend of some indicators, when observing this time series, these indicators need to be continually monitored so that the real impacts of the proposed actions to improve the general scenario are verified, and especially the age groups who have not shown reduced rates. Interventions should be considered not only in health, but those that also cover socioeconomic and humanitarian indicators.

DESCRIPTORS: Epidemiology. Hospital Procedures. Cervical Cancer. Time Analysis.

RESUMEN

El cáncer de cuello uterino (CC) es el tercer tumor más frecuente en la población femenina. Debido a la importancia de su morbimortalidad, desde mediados de la década de 1980 se han desarrollado políticas de salud pública en Brasil. Es decisivo detectar las lesiones en estadios precoces para el pronóstico y conducta a adoptar, pues las lesiones en estadio más avanzado, suelen requerir procedimientos más invasivos e internaciones hospitalarias. A pesar de las medidas de prevención y control actualmente adoptadas, es importante monitorizar las tasas de prevalencia de procedimientos hospitalarios por cáncer de cuello uterino y su letalidad, con el objetivo de contribuir a la planificación de acciones de prevención. OBJETIVO: Describir la frecuencia de procedimientos hospitalarios para CC en Minas Gerais y observar su tendencia de 2012 a 2021. MÉTODOS: El presente trabajo consiste en un estudio descriptivo, ecológico, observacional de los procedimientos hospitalarios por CC en Minas Gerais en 2021; y un estudio analítico de 2012 a 2021. RESULTADOS Y DISCUSIÓN: En Minas Gerais en 2021 se realizaron 2.122 procedimientos hospitalarios por CC. El grupo etario más frecuente fue el de 35 a 44

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años, seguido por el de 45 a 54 años. Del total de procedimientos, los ingresos hospitalarios para tratar a pacientes con cáncer fueron los más frecuentes, seguidos de otros dos procedimientos clínicos. El análisis de esta serie temporal ha mostrado un descenso significativo cuando los procedimientos se observaron de forma global (todos los grupos de edad) y para las personas de 35 a 44 años y de 45 a 54 años. CONCLUSIÓN: A pesar de la tendencia de mejoría de algunos indicadores, al observar esta serie de tiempo, estos indicadores necesitan ser monitoreados continuamente para que se verifiquen los impactos reales de las acciones propuestas para mejorar el escenario general, y en especial los grupos de edad que no han mostrado tasas reducidas. Las intervenciones deben ser consideradas no sólo en salud, sino aquellas que abarquen también indicadores socioeconómicos y humanitarios.
PALABRAS CLAVE: Epidemiología. Procedimientos Hospitalarios. Cáncer de Cuello Uterino. Análisis de Tiempo.

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INTRODUCTION

Cervical cancer (CC) is the third most frequent cancer in the female population, only behind breast and colorectal cancer, and it is the fourth leading cause of cancer death in women in Brazil. In 2020, it accounted for 6,627 deaths, corresponding to a crude mortality rate of 6.12 deaths for every 100,000 women. [1]

In Brazil, the estimated number of new diagnoses for every year of the triennium 2023-2025 is 17,010, and it corresponds to an estimated risk of 15.38 cases per 100,000 women (BRASIL, 2022). The Southeast region of Brazil is one of the most developed and urbanized areas in the country and the incidence is estimated at 6,020 (8.57 in the adjusted rate)[2].

Cervical cancer is a tumor that develops from changes caused by abnormal cell growth, leading to progressive intraepithelial changes of several layers that cover the lower part of the uterus [3]. There are two different types, the most common is the squamous-cell carcinoma which mainly affects the squamous epithelium, and the adenocarcinoma affects the glandular epithelium [4]. In histopathology, early lesions, generally asymptomatic, may become cancerous after 10 years or more, progressing through the different stages of dysplasia [5].

The main risk factors associated with the development of CC include the infection with Human Papillomavirus (HPV), early onset of sexual activity, multiple sexual partners, genetic predisposition, immunological status, low socioeconomic status, long-term use of oral contraceptives and smoking [6].

Due to the importance of morbimortality in CC, public health policies have been developed in Brazil since the mid-1980s. The National Cervical Cancer Control Program (Programa Nacional de Controle do Câncer de Colo de Útero) in Brazil foresees the access to different services to face each stage of the disease, with the early detection (screening) of CC in asymptomatic women as the most effective measure. The early diagnosis performed through the screening test (Pap smear test) associated with the treatment of precursor lesions is fundamental to prevent and reduce the mortality by this type of cancer [7, 8].

Measures to strengthen the control of CC in Brazil reached important regulatory milestones. In addition, it started to be contemplated by other control strategies such as Strategic Action Plan for Combatting Chronic Non-Communicable Diseases (CNCD) (Plano de Ações Estratégicas para o Enfrentamento das Doenças Crônicas Não Transmissíveis) from the Health Ministry. Thus, we may highlight the launch of the Viva Mulher program and Portaria GM/MS (ordinance) n 3040, in 1996, that established the National Program to Combat Cervical Cancer (Programa Nacional de Combate ao Cervical Cancer) in 1998. In 2005, its control was established as a priority through the National Oncological Care Policy (Política Nacional de Atenção Oncológica) Ordinance GM/MS n 2439, being also contemplated by the Health Pact (Pacto pela Saúde) established by the Ordinance GM/MS n 399 from 2006 [9, 10].

In 2011, the public policy was reinforced by the federal government with the disclosure of the Action Plan for Strengthening the Cancer Prevention, Diagnosis and Treatment Network (Plano de Ação para Fortalecimento da Rede de Prevenção, Diagnóstico e Tratamento do Câncer). In 2013, Ordinance n 874/2013 instituted National Policy for the Prevention and Control of Cancer (Política Nacional para a Prevenção e Controle do Câncer) in the Health Care Network for People with Chronic Diseases (Rede de Atenção à Saúde das Pessoas com Doenças Crônicas) within the Brazilian Unified Health System (Sistema Único de Saúde - SUS) [11].

Due to the close association between HPV-virus infection with the development of cervical cancer, the Ministry of Health, through the National Immunization Program (NIP) (Programa Nacional de Imunizações - PNI), expanded the National Vaccination Calendar (Calendário Nacional de Vacinação) by introducing the quadrivalent HPV vaccine in the Unified Health System in 2014 [12].

Currently, cervical cancer is susceptible to eradication by screening and treating precursor lesions and vaccinating against all most prevalent oncogenic HPV types. In 2020, The Health Ministry was committed to eradicate this disease in Brazil, adhering to the global strategy proposed by the World Health Organization (WHO) based on targets to be achieved by 2030: 90% coverage of Human Papillomavirus (HPV) vaccination in girls under 15; 70% coverage with HPV testing among women aged 35 to 45 years old; and 90% coverage of treatment, including palliative care [1, 13].

> Despite control and preventive measures currently adopted, high CC incidence and mortality rates may still be seen, especially in low- and middle-income countries, such as Brazil. [14]

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Given the magnitude of this neoplasm in terms of prevalence and of its impact on the Brazilian health sector, due to early detection actions and efforts to effectively control it and, also considering that monitoring cases over time and the knowledge it generates can support the assessment and planning of public policies to its control [15], the present study aims to describe the scenario in the state of Minas Gerais regarding procedures for CC, in 2021, as well as to identify the trend of these procedures from 2012 to 2021. Thus, supporting decision-making to determine priorities in public health, serving as an indicator for actions involving CC case control.

METHOD

The present study falls within the foreseen cases of exemption from submission to the committee of ethics in research, in accordance with items III and IV, from the article n 1 of the Resolution 510, from April 07th, 2016 of the National Council of Health (Conselho Nacional de Saúde). It consists of a descriptive, ecological, observational study of hospital procedures for CC in Minas Gerais in 2021; and an analytical study from the 2012 to 2021. Data (frequency and costs) were obtained for tab of the information of reduced Hospitalization Authorizations available from DATASUS, using TabWin version 3.0. The following filters were used: 1- Year/month of hospital admission; 2- Constant procedures in appendix I. 3- ICD-10 diagnosis (category) C.53.

The population used to build the rates is the female population of Minas Gerais, according to estimates for the period of 2000 to 2030 made by the Brazilian Institute of Geography and Statistics (IBGE), available for tab on TabNet. In order to analyze the time series, simple linear regression was used, in addition to Prais-Winsten estimation that was applied taking into account the serial correlation. Hospital admission rates were considered as dependent variables and time was considered as an independent variable.

Statistical analyses were performed using RStudio Desktop for Windows. Statistics of t test was used to evaluate the hypothesis of nullity of the value of β. As for the calculation of the costs of procedures from Brazilian reais to dollars, the value was the one of the quotation of December 31st of each year analyzed, according to the Ipea website (http://www.ipeadata.gov.br/) .

RESULTS AND DISCUSSION

A descriptive analysis of hospital procedures for cervical cancer has a long history in public health and it is important because it may help to prevent future trends, enabling action planning and the definition of new public policies involving disease control in the region.

In 2021, Minas Gerais had a population of 21,551,426 inhabitants, and 10,844,685 of them were women. Table 1 shows the distribution of the frequency of the female population by age group, from 15 years of age.

According to SIH/SUS, 2,122 hospital procedures for CC were performed in Minas Gerais in 2021. The most prevalent age group was 35- to 44-year-olds, with 534 (25%) procedures; followed by 45- to 54-year-olds with 508 (24%), in accordance with the study conducted by Soares et al., in 2010 . [16]

Of the total number of procedures performed, the procedure "clinical treatment of cancer patient" was the most frequent one (513 procedures), followed by another clinical procedure, "treatment of clinical complications of cancer patients" (448). The third most common clinical procedure was "hospitalization for continuous chemotherapy" (109). Of the surgical procedures performed, extended total hysterectomy in oncology was the most common one (193).

Table 2 shows the distribution of the frequency of procedures for CC per age group in Minas Gerais in 2021. Clinical procedures were highlighted in gray.

All of the 2,122 procedures performed generated a cost of R$ 3.671.127,04 ($704,630.90). Of the total amount, R$ 2.770.328,27 ($531,732.87) was employed in a clinical-surgical setting and R$ 900.798,77 ($172,898.03) was employed for the clinical treatment of the cancer patient, including chemotherapy and therapy of complications. In addition to being the most common surgical procedure in the year of 2021, "extended total hysterectomy in cancer" represented the highest overall in-hospital expense related to CC, R$ 1.344.759,28 ($375.415,79), representing 36.6% of the total value of procedures for CC in Minas Gerais in 2021. Figure 1 shows the proportion of expenses.

Rates of mutilating procedures for CC (0409060038, 0409060119, 0409060135, 0416060013, 0416060064, 0416060080, 0416060110) were built using the population of women assigned to the referred year as a denominator, being stratified by age group. Figure 2 shows the time series for the rates created. Table 2 shows the autoregressive model of Prais Winsten applied to the trend analysis. The application of autoregressive models has been recommended to analyze the trend of a time series . [17]

When looking at the rate of procedures for the female population of Minas Gerais, a decreasing trend

Table 1: Distribution of the frequency of the female population by age group, from 15 years of age, in 2021

Age group	15-24	25-34	35-44	45-54	55-64	65 +
Frequency	1,568,571	1,651,283	1,718,832	1,396,504	1,205,335	1,314,323

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was observed β1=-0.5734 (p=0.034). For rates stratified by age group, the following age groups showed stability for the series analyzed: 15- to 24-year-olds, 25-to 34-year-olds, 35- to 44-year-olds. The 45- to 54-year-old age group showed a decreasing trend β1= -1.6421 (p=0.022), as well as the 55- to 64-year-old age group, β1= -3.2302 (p= 0.002) and 65 and over, β1= -2.1487 (p= 0.007).

The choice of in-hospital procedures to treat CC depends mainly on the disease staging, which is directly related to the interval between diagnosis and the start of treatment. Aiming to reduce this interval, Master Plan for Regionalization (MPR) (*Plano Diretor de Regionalização*) has been implemented to reinforce Health Care Networks (*Redes de Atenção em Saúde*) and to establish Expanded Health Regions (EHR) (Regiões Ampliadas de Saúde), which are geographical boundaries able to enable the organization and implementation of health actions in an integrated manner. All of the 853 counties of the state of Minas Gerais are currently grouped into 14 EHRs (*Norte, Nordeste, Sul, Sudeste, Centro, Centro-Sul, Oeste, Jequitinhonha, Triângulo do Sul, Triângulo do Norte, Leste, Leste do Sul, Noroeste and Vale do Aço*), which show significant differences in crude incidence rates of cervical cancer [18].

The reduction in mortality from CC was included as a priority in the Health Pact in 2006, and one of its goals was to expand the offer of CC screening tests for the target population, and to treat and follow up precursor lesions on an outpatient basis [19]. Thus, the observed decrease in procedure rates may be a positive indicator for *primary* care actions and for the female population.

The trend for hospital procedures rate is inversely related to the supply of cytopathological tests [20]. According to Parada et al. (2008), the supply of cytopathological tests has grown in Brazil. They also consider that, despite the advances, the supply of cytopathological tests still falls short of the need for an adequate coverage of the population. In addition, a study carried out by INCA, between 1980 and 2006, showed that only 30% of women are submitted to the test at least three times in their lifetime, resulting in delayed diagnoses in 70% of cases [21].

In spite of the existence of the screening test, it is observed that it is not equally available among all regions, neither is it properly understood. It is focused on large urban centers, and it is more easily accessed by people with a better social status. The existing socioeconomic inequalities are associated with the diagnosis of advanced stage cervical cancer [21–23]. According to Corrêa et. al. (2017), in Minas Gerais, from 2006 to 2011, there was observed stability in the ratio of Pap smears in women from 25 to 59 years old, not having reached the agreed goal, which suggests

Table 2: Frequency of hospital procedures performed for CC stratified by age range for Minas Gerais in 2021

PROCEDURES PERFORMED	15-24	25-34	35-44	45-54	55-64	65 E+	TOTAL
0304080020 HOSPITALIZATION FOR CONTINUOUS ADMINISTRATION CHEMOTHERAPY	1	5	6	27	32	38	109
0304100013 TREATMENT OF CLINICAL INTERCURRENCES IN ONCOLOGICAL PATIENTS	6	65	105	109	80	83	448
0304100021 CLINICAL TREATMENT OF ONCOLOGICAL PATIENTS	7	65	121	106	114	100	513
0407040161 EXPLORATORY LAPAROTOMY	0	5	4	4	5	3	21
0409010170 ENDOSCOPIC INSTALLATION OF DOUBLE J CATHETER	1	11	17	27	15	11	82
0409060038 EXCISION TYPE 3 OF THE CERVIX	3	38	30	22	4	5	102
0409060046 SEMIOTIC CURETAGE WITH OR WITHOUT CERVICAL DILATION	1	2	5	5	3	10	26

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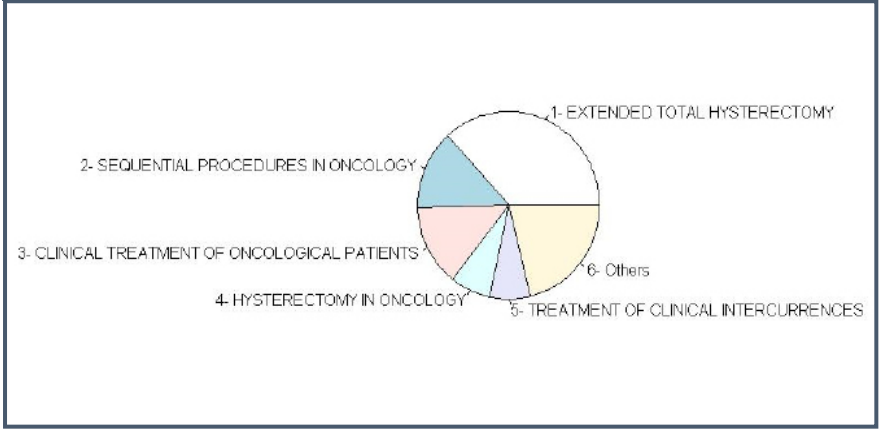
0409060119 HYSTERECTOMY WITH ANEXECTOMY (UNI / BILATERAL)	0	6	24	14	10	3	57
0409060135 TOTAL HYSTERECTOMY	0	4	27	26	6	4	67
0415020034 OTHER PROCEDURES WITH SEQUENTIAL SURGERIES	0	4	7	10	5	2	28
0415020050 SEQUENTIAL PROCEDURES IN ONCOLOGY	0	4	18	13	15	12	62
0416060013 CONICAL AMPUTATION OF THE CERVIX WITH COLPECTOMY IN ONCOLOGY	1	17	13	5	3	2	41
0416060064 EXTENDED TOTAL HYSTERECTOMY IN ONCOLOGY	2	26	64	44	34	23	193
0416060080 RADICAL TRACHELECTOMY IN ONCOLOGY	1	10	5	3	5	1	25
0416060110 HYSTERECTOMY WITH OR WITHOUT ANEXECTOMY (UNI / BILATERAL) IN ONCOLOGY	0	9	29	23	18	9	88
Others							260
Total							2122

low access of the target population to the screening program CC[24].

According to Lofters et. al. (2010) and Ribeiro et. al. (2013), in general, CC-susceptible populations usually have some knowledge of the disease, strengthening the hypothesis that the access to health services and tests and the social conditions linked to the awareness the development of the disease, corroborating the findings of Thuler et.al. (2014)[22, 23, 25]. Nevertheless, the population of Minas Gerais continues to have unsafe sex. This fact may be corroborated when analyzing the number of new cases of HIV in the state of Minas Gerais that, according to the 2016 Epidemiological Bulletin, there was a 10% increase per year from 2010 to 2015 [19].

Figure 1: Relative value of procedures for CC in Reais (Brazilian currency R$) in 2021



Late diagnosis increases total costs with the disease, considering that advanced staging predicts a decline in the general condition of patients, requiring interventions to treat the consequences of the natural progression of the disease, such as frequent hospitalizations in tertiary care. Many times, in intensive care, there is a need for invasive surgical procedures with palliative intent, use of blood products, supportive medications and extended antimicrobial therapies, in addition, of course, to chemotherapy treatment [20, 24].

The correlation between the results of this study and the literature findings is coherent, since the decrease in the frequency of the procedures for CC has

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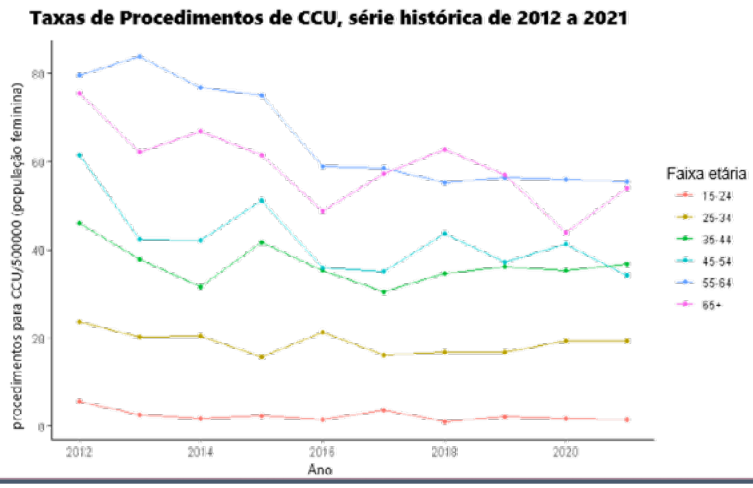
Figura 2: Rates of hospital procedures for CC, time series from 2012 to 2021.



Fonte: elaborada pelo autor, dados da pesquisa.

Table 3: The trend for the rate of hospital procedures for CC, stratified by age group and general for the time series from 2012 to 2021

AGE GROUP	ESTIMATED 1	P VALUE	TREND
15 - 24	-0.2292	0.0584	Stability
25 - 34	-0.3753	0.138	Stability
35 - 44	-0.6044	0.207	Stability
45 - 54	-1.6421	0.022	Decreasing
55 - 64	-3.2302	0.002	Decreasing
65 +	-2.1487	0.007	Decreasing
Total	-0.5734	0.034	Decreasing

not yet been verified in the younger age group where early lesions are expected. This decrease was verified in older age groups (35- to 54-year-olds), according to studies conducted by Guimarães (2012) and Casarin (2011), where diagnoses are already late [26, 27]

CONCLUSION

In Minas Gerais, although CC procedures rate shows a downward trend, indicators of the disease require continuous monitoring, providing subsidies to plan and execute new actions.

Despite the positive result found, it was not possible to clearly establish a hypothesis that explains it. Possibly, the instruction and the combination of variables is associated with the result.

At the end of the study, it was possible to observe that several projects had been implemented to control CC, however a lot still needs to be addressed. Interventions should be considered not only in the field of health, but also those that involve socioeconomic and humanitarian aspects.

Therefore, aspects of this study need to be reformulated and to be more detailed in order to cover the largest possible number of impacting variables on the end result that is expected for the disease.

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