

Non-attendance as a factor of waste: challenge for SUSTainability in a universal health system

Absenteísmo de usuários como fator de desperdício: desafio para SUSTentabilidade em sistema universal de saúde

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ABSTRACT Non-attendance to specialized healthcare appointments, diagnostic, and therapeutic procedures is a global problem in healthcare, leading to the wastage of resources both in the public and private sectors. This study aims to estimate financial wastage of resources linked to non-attendance to scheduled health specialist appointments and procedures in the metropolitan region of the Espírito Santo State (ES), Brazil, between 2014 and 2016. We studied 1.002.719 specialized healthcare procedures, being 666.182 appointments with specialized physicians and other healthcare professionals, and 336.537 specialized diagnostic and other therapeutic procedures. Non-attendance date were retrieved from the administrative procedure scheduling database (SisReg-ES) available in the ES Regulatory Agency and provided by the ES Health Office. Financial values used to estimate wastage were retrieved from the SUS and other standard tariff lists for medical procedures, and used according to the administrative regime of the three types of service providers. Non-attendance average rate for medical and health specialists' appointments achieved 38.6%, or 257.025 missed appointments, equivalent to an estimated waste of resources of R\$3.558.837,88. Non-attendance as for other specialized procedures reached 32.1%, or 108.103 missed procedures, equivalent to R\$15.007.624,15. Total wasted resources reached significant values, evincing the ongoing challenge to managers seeking to attain SUSTainable universal health care systems.

KEYWORDS Absenteeism. Secondary care. Health management. Integrality in health.

RESUMO O *absenteísmo de usuários em consultas e exames é considerado um problema mundial na assistência à saúde, gerando desperdício de recursos tanto no setor público como no setor privado. O objetivo deste estudo foi o de estimar o desperdício de recursos monetários vinculado ao absenteísmo em procedimentos especializados no Sistema Único de Saúde (SUS) na Região de Saúde Metropolitana do Espírito Santo (RSM-ES) entre os anos de 2014 e 2016. Analisaram-se 1.002.719 procedimentos, sendo 666.182 consultas e 336.537 exames especializados. Os dados de absenteísmo foram retirados dos registros administrativos do Sistema de Regulação do ES (SisReg-ES), fornecidos pela Secretaria Estadual de Saúde. Os valores monetários foram obtidos por meio da Tabela SUS, da tabela complementar de convênios e da tabela de custos estimados, segundo o tipo de prestador envolvido no atendimento. A taxa média de absenteísmo para consultas foi de 38,6% (257.025 consultas), gerando um total estimado de R\$3.558.837,88; e para exames especializados, foi de 32,1% (108.103 exames), em um total estimado de R\$15.007.624,15. Os valores totais desperdiçados são significativos e evidenciam o desafio constante na agenda dos gestores na busca pela SUSTentabilidade em sistemas universais de saúde.*

PALAVRAS-CHAVE *Absenteísmo. Atenção secundária à saúde. Gestão em saúde. Integralidade em saúde.*

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Introduction

Non-attendance of users is the act of missing consultations or scheduled procedures without any prior communication¹. It is considered a global problem in health care both in the public and private sectors as per papers published in Brazil^{2,3} and worldwide⁴⁻⁶. A systematic review on the subject revealed a 23% worldwide non-attendance average rate, being the highest rate found in Africa (43.0%), followed by South America (27.8%), Asia (25.1%), North America (23.5%), Europe (19.3%) and Oceania (13.2%)⁷. When the Unified Health System (SUS) is concerned, non-attendance to specialized healthcare appointments is accounted as a chronic problem since rates are close to or beyond 25%⁸, reaching high percentages in various types of care and medical specialties⁹.

Non-attendance to specialized healthcare appointment has been related to some causes, such as forgetfulness^{3,10} communication failures between the service and the user, reduction of illness symptoms¹¹, scheduling at working hours^{2,10-12}, lack of transportation⁴. Among the consequences, we highlight the increase in the waiting list and in urgencies^{2,12}, the waste of public resources^{2,4-6,13}, the reduction of productivity, and clinic and management loss of efficiency⁵. Those consequences hinder the access and lead to health care increasing costs^{2,3,14}, which generates social costs¹⁵, causes negative attitudes on the professional¹⁶ and delays the diagnosis and appropriate treatment¹³. In summary, non-attendance is considered a multi-causal phenomenon, reflecting on every stakeholder, i.e., management, worker and user^{2,3}.

Health care within SUS is divided into primary care, secondary care or medium complexity and tertiary care or high complexity¹⁷. The user gateway to the system is the primary care through also the Health Basic Units (UBS) as an Emergency Care

Unit (UPA)^{17,18}. Primary care should solve more than 85% of the population's health problems, and the user should be addressed to specialized care whenever necessary¹⁹.

However, since SUS creation in 1988, the system has been facing numerous difficulties regarding the user access to resolving, appropriate, timely and effective health actions and services. The extent of benefits brought to the population throughout its existence is undeniable, but, in practice, it is still partial, facing numerous weaknesses and shortcomings²⁰. SUS has been implemented but not consolidated²¹. Access to specialized or medium complexity services has been stressed as one of the main obstacles to its consolidation²².

Population aging has contributed to increase Chronic Non-Communicable Diseases (NCDs), the demands of specialized care, therefore imposing new challenges on the health system¹⁸. The increased prevalence of NCDs may also be explained by larger access to health services and to means of diagnosing those diseases²³. Currently, the demand for diagnostic and therapeutic procedures due to NCDs is becoming a public health priority in Brazil²⁴.

So, service management needs to acknowledge in its planning the changes in the country's illness scenario in recent decades²⁵. Thus, to qualify the management of services in 2008, the Ministry of Health (MS) created the National Health Regulatory Police²⁶. The regulation of access to health is applied by the state as an important tool of public management, still under improvement, with the aim to achieve efficiency, equity and balance between supply, demand and financing²⁷. The actual regulatory system (SisReg) is available online by means of SUS Computer Department (Datusus), MS, to manage the entire regulatory complex and run the Country' regulatory centers. In this regard, the regulatory policy allows managers to know the size of waiting lists and

non-attendance by means of the database it produces, guiding management in the search for solutions.

In the Metropolitan Health Region of Espírito Santo State (RSM-ES), non-attendance to specialized care service appointment is a frequent problem experienced by the Health State Department (Sesa-ES), which has caused losses to the population and to public budget due to the huge number of SUS users that do not cancel neither attend to scheduled consultations and tests. According to Sesa-ES data, in the first half of 2015, the non-attendance rate achieved 38% as per consultations and specialized tests scheduled by the Regulatory Center²⁸.

Thus, non-attendance to specialized healthcare appointment has drawn the attention of SUS managers in Brazil, because it contributes to the waiting list increase, what, added to missing patients who tend to return to the waiting list, leads to a decrease in the supply rationalization, increasing the waiting time for a new consultation². Currently, challenges regarding the provision of services by specialized care are numerous, and, possibly, will be aggravated by the Constitutional Amendment (EC) 95/2016, which limits public spending for 20 years and can hinder the increase of resources for health and other social policies, posing a major threat to these demands. Budget cuts could impact the population health indicators^{29,30}.

In this sense, improving health management is necessary to fight against and to reduce expenditures so to increase efficiency by optimizing available financial resources. In 2010, World Health Organization (WHO) released the 'Universal Coverage Funding' report revealing that 20% to 40% of all health spending are wasted with inefficiency, resources that could be invested to attain universal coverage.

On the other hand, only scarce studies address non-attendance as a source of

waste and apply economic evaluation as analytical methods of non-rendering services so to evince the waste caused by non-attendance⁴. Most part of the publications addresses the causes and strategies for non-attendance reduction, being even emphatic in stating that they cause monetary loss, usually adopting approaches supported by empirical evidence⁵. Thus, it is increasingly necessary that the concepts of economic evaluation be part of the health systems and services routine³¹.

Based on the considerations that identify non-attendance as a SUS growing problem, the aim of this study was to estimate the waste of monetary resources related to the non-attendance to SUS specialized procedures in RSM-ES between 2014 and 2016.

Methods

This is a descriptive study based on administrative records and carried out in RSM-ES, Southeast Region of Brazil. ES region is composed of the 20 municipalities that show the best Municipal Human Development Indices (HDI-M) of Espírito Santo State (0.68 to 0.856), and has a population of 1,935,393 inhabitants³².

Data were gathered from 1,002,719 specialized consultations and tests scheduled for January 2014 to December 2016 in SisReg-ES, provided by Sesa-ES. The scheduled procedures refer to vacancies made available per specialties by the Integrated Agreed Schedule (PPI), and performed between the state and the municipalities of the region. We analyzed 666,182 specialized consultations and 336,537 specialized tests, in a total of 38 procedure premises, which included different scheduling specialties in public institutions of governmental management and in those contracted by SUS; in philanthropic institutions; and in public services managed by Social Organizations (OS).

The following variables were selected: years 2014, 2015 and 2016; scheduled procedure – codes for kinds of scheduled specialized consultation and test; confirmed procedure – performed in the presence of the patient; non-confirmed procedure – patient's non-attendance; specialized consultations and tests – list of medium complexity care procedures; and place – premises where procedures were performed. Initially, data were classified per consultations and tests and year of scheduling.

Consultations recorded followed the several names applied by SisReg-ES, having been necessary to use the Brazilian Classification of Jobs (CBO) issued by the Ministry of Labor so to recodify medical specialties and those concerning the practitioner. The various names given to the same specialty were grouped into a single CBO classification for further coding and definition of correspondence (from-to) to the procedures of the Tables of values and prices applied.

Specialized tests encoded by the SisReg-ES table were also re-codified, following the procedure adopted for consultations. Tests were gathered into groups and subgroups, as stated by the classification issued by SUS Unified Table of Procedures, Medicines and Strategic Inputs (SUS Table), so to identify the number of scheduled tests, confirmed tests, non-attendance, and monetary amount. Group 02 was constituted of all subgroup procedures related to diagnostic purposes; group 03 formed by all subgroup procedures related to clinical procedures; and group 04 was made up of all subgroup procedures related to surgical procedures.

Values assigned to each procedure varied as for remunerations linked to procedure premises and their administrative natures. For procedures performed in federal and in state public institutions of governmental management and for those contracted from

SUS (indirect management), the referencing values was SUS Table (Table SUS/2018). For philanthropic institutions, we added the values contained in the complementary tables issued in the 2018 additions provided by Sesa-ES and in those contained in Table SUS/2018. For public services under OS management, we adopted the table of estimated cost per procedure premise provided by Sesa, which adopts the tool called Key Performance Indicators for Health (KPIH) to carry out the cost management system. All values were updated for 2018.

Consultation and test procedures were grouped per specialty, totaling the scheduled value, the confirmed one, the non-attendance (non-confirmed procedures = scheduled-confirmed) and the annual monetary value per specialty attributed to non-attendance, following the tables organized by the administrative nature of the procedure premise. Subsequently, specialties were listed in ascending order per non-attendance rate and per monetary value generated in each specialty.

Annual non-attendance rates regarding specialized consultations and tests were calculated by dividing the total non-attended procedures by the total scheduled procedures as per each specialty. The result was multiplied by one hundred.

Monetary values of estimated waste were obtained by multiplying the total non-attended annual procedures per specialty by the values attributed to each procedure according to the administrative nature of the procedure premise.

The Microsoft Office Excel® program was applied in the analysis. The study was authorized by Sesa-ES by means of the Term of Consent dated September 26, 2017, file n° 79619819/2017, and approved by the Research Ethics Committee of the Federal University of Espírito Santo (Ufes) under the National Health Council resolution no 2,631,695, dated May 2, 2018.

Results

In the course of the study, 666,182 consultation procedures and 336,537 specialized tests were accounted, totaling 1,002,719 procedures, equivalent to R\$18,566,462.03 wasted monetary value attributed to non-attendance. But these values need a careful consideration since the research faced limitations due to the weaknesses of SisReg-ES database and to the lack of economic analysis per procedure premise, therefore, not offering information on the actual procedure cost.

The specialized consultations scheduled for 34 specialties showed a 38.6% non-attendance average rate (257,025 consultations), equivalent to R\$3,558,837.88 estimated waste. All clinical consultations added, the specialty that showed the lowest non-attendance monetary value during the three years of study was the clinical oncologist's (R\$880.00), while the one showing the highest value was the ophthalmologist's (R\$558,262,20). Non-attendance rates per specialized healthcare ranged from 0% (dentist for patients carrying special needs) to 75.9% (general physiotherapist). We note that scheduled consultations with dentist for patients carrying special needs were not offered in 2015 and 2016 (*table 1*).

Only the surgical cancerologist medical specialty (2.9%) showed a non-attendance rate smaller than 30% (26.4%), equivalent to R\$900.00 non-attendance waste. Among the total, 19 specialties, equivalent to 55.9%, showed a non-attendance rate ranging between 30% and 40%. Consultations with oral and maxillofacial dentists (30.2%) showed the lowest group rate, while consultations with pulmonologists showed the highest one (39.4%), this latter totaling R\$1,761,422.86 non-attendance estimated waste. Nine specialties (26.5%) showed a non-attendance rate ranging between 40% and 50%, the gastroenterologists and neurologists' consultations achieving the lowest rate (40.1%), while geneticists exhibited the highest rate (47.4%). These specialties added amounted to a R\$1,671,403.22 waste.

Two specialties (5.9%) showed non-attendance rates between 50% and 60% – pediatric surgeon (52.5%) and infectious diseases (58.3%) –, equivalent to R\$62,831.80 estimated waste. Only physiotherapist consultations (2.9%) showed a non-attendance rate greater than 60% (68.4%), equivalent to R\$45,630.00 estimated waste. General physiotherapist consultations (2.9%) showed the highest non-attendance rate (75.9%), equivalent to R\$16,650.00 estimated waste.

Table 1. Non-attendance description as per specialized consultations within the Metropolitan Health Region, Espírito Santo State, Brazil, 2014-2016

2014				2015				2016				2014-2016		Waste	
A	C	Abs.	Value R\$	A	C	Abs.	Value R\$	A	C	Abs.	Value R\$	Ag. Total	Tx. Abs.	Value (R\$)	N (%)
Clinical Oncologist															
104	73	31	310.00	73	50	23	230.00	88	54	34	340.00	265	88 (33.2)	880.00	
Clinical Oncologist															
94	73	21	210.00	109	81	28	280.00	127	89	38	410.00	330	87 (26,4)	900.00	
Dental Surgeon - General Physician															
67	38	29	390.00	106	59	47	760.00	109	84	25	390.00	282	101 (35,8)	1,540.00	
Geneticist															
34	15	19	380.00	54	28	26	520.00	102	57	45	900.00	190	90 (47,4)	1,800.00	

Table 1. (cont.)

2014				2015				2016				2014-2016		Waste	
A	C	Abs.	Value R\$	A	C	Abs.	Value R\$	A	C	Abs.	Value R\$	Ag. Total	Tx. Abs. N (%)	Value (R\$)	
Oral and Maxillofacial Dentist															
90	61	29	290.00	186	124	62	3,037.75	254	185	69	3,204.46	530	160 (30.2)	6,532.21	
Thoracic Surgeon															
36	22	14	140.00	96	59	37	790.13	175	107	68	5,728.92	307	119 (38.8)	6,659.05	
Plastic Surgeon															
879	511	368	4,550.00	1,216	776	440	5,050.00	1,049	653	396	4,620.00	3144	1,204 (38.3)	14,220.00	
Head and Neck Surgeon															
457	310	147	10,307.00	542	347	195	2,220.00	969	646	323	3,480.00	1968	665 (33.8)	16,007.00	
General Physiotherapist															
908	243	665	6,650.00	714	91	623	6,230.00	572	195	377	3,770.00	2194	1,665 (75.9)	16,650.00	
Breast physician															
2,137	1,493	644	6,560.00	2,065	1,427	638	7,280.00	1,943	1,334	609	6,620.00	6145	1,891 (30.8)	20,460.00	
Infectious Disease Physician															
425	259	166	9,821.80	305	147	158	1,950.00	924	283	641	11,810.00	1654	965 (58.3)	23,581.80	
Geriatrician															
2,574	1,796	778	7,780.00	2,403	1,586	817	8,170.00	2,466	1,618	848	8,480.00	7443	2,443 (32.8)	24,430.00	
Hematologist															
3,102	2,025	1,077	11,370.00	3,610	2,243	1,367	14,870.00	3,229	2,065	1,164	12,920.00	9941	3,608 (36.3)	39,160.00	
Pediatric Surgeon															
1,497	594	903	9,720.00	2,030	1,041	989	11,520.00	2,824	1,380	1,444	18,010.00	6351	3,336 (52.5)	39,250.00	
Gynecologist and Obstetrician															
2,897	2,000	897	10,830.00	3,185	2,185	1,000	11,040.00	3,978	2,389	1,589	17,450.00	10060	3,486 (34.7)	39,320.00	
Physiatrist															
1,855	6,38	1,217	12,170.00	2,322	635	1,687	16,870.00	2,493	834	1,659	16,590.00	6670	4,563 (68.4)	45,630.00	
Nephrologist															
6,226	4,229	1,997	20,120.00	4,152	2,738	1,414	14,980.00	2,895	1,856	1,039	10,590.00	13273	4,450 (33.5)	45,690.00	
Allergist and Immunologist															
3,369	2,117	1,252	12,520.00	4,845	2,956	1,889	18,890.00	4,959	3,062	1,897	18,970.00	13173	5,038 (38.2)	50,380.00	
Neurosurgeon															
1,157	830	327	39,689.80	572	352	220	8,481.00	491	245	246	2,600.00	2220	793 (35.7)	50,770.80	
Pulmonologist															
4,594	2,838	1,756	21,505.00	4,460	2,763	1,697	20,545.00	2,535	1,424	1,111	11,350.00	11589	4,564 (39.4)	53,400.00	
Rheumatologist															
5,494	4,082	1,412	14,230.00	7,851	5,140	2,711	28,100.00	6,778	4,665	2,113	21,710.00	20123	6,236 (31.0)	64,040.00	
Colorectal Surgeon															
3,147	1,889	1,258	14,270.00	3,754	2,028	1,726	19,190.00	6,264	3,169	3,095	33,890.00	13165	6,079 (46.2)	67,350.00	

Table 1. (cont.)

2014				2015				2016				2014-2016		Waste	
A	C	Abs.	Value R\$	A	C	Abs.	Value R\$	A	C	Abs.	Value R\$	Ag. Total	Tx. Abs. N (%)	Value (R\$)	
Cardiologist															
7,369	4,803	2,566	52,759.60	6,317	3,724	2,593	29,000.00	10,013	5,598	4,415	45,470.00	23699	9,574 (40.4)	127,229.60	
Vascular Physician															
2,559	1,425	1,134	65,765.80	5,957	3,570	2,387	43,046.95	7,448	4,160	3,288	42,297.00	15964	6,809 (42.7)	151,109.75	
General Surgeon															
7,019	4,219	2,800	93,084.20	6,810	4,050	2,760	38,936.60	4,234	2,493	1,741	20,720.00	18063	7,301 (40.4)	152,740.80	
Psychiatric															
13,396	8,268	5,128	53,956.00	15,373	9,323	6,050	60,500.00	12,296	7,736	4,560	45,600.00	41065	15,738 (38.3)	160,056.00	
Neurologist															
8,654	5,260	3,394	58,533.54	10,915	6,598	4,317	64,084.45	7,683	4,465	3,218	40,185.13	27252	10,929 (40.1)	162,803.12	
Urologist															
14,736	10,237	4,499	79,112.00	15,638	11,052	4,586	49,660.80	14,798	9,522	5,276	55,860.00	45172	14,361 (31.8)	184,632.80	
Gastroenterologist															
8,088	5,382	2,706	84,532.60	6,571	3,930	2,641	54,047.20	11,472	6,340	5,132	52,840.00	26131	10,479 (40.1)	191,419.80	
Endocrinology and Metabolism Physician															
16,217	10,945	5,272	56,635.00	18,678	12,006	6,672	69,090.00	19,263	12,731	6,532	68,400.00	54158	18,476 (34.1)	194,125.00	
Otolaryngologist															
18,850	11,700	7,150	83,404.40	21,081	13,261	7,820	84,963.40	15,917	9,792	6,125	62,490.00	55848	21,095 (37.8)	230,857.80	
Dermatologist															
23,810	13,602	10,208	104,810.00	25,478	14,784	10,694	111,200.00	26,782	16,106	10,676	110,600.00	76070	31,578 (41.5)	326,610.00	
Orthopedist															
20,425	12,189	8,236	185,651.44	28,408	16,830	11,578	123,410.37	41,935	24,662	17,273	181,278.34	90768	37,087 (40.9)	490,340.15	
Ophthalmologist															
18,562	12,536	6,026	131,920.00	19,942	12,342	7,600	204,292.68	22,468	14,127	8,341	222,049.52	60972	21,967 (36.0)	558,262.20	
Dental Surgeon - Special Need Patient															
3	3	0	-	0	0	0	-	0	0	0	-	3	-	-	
Total															
200,831	126,705	74,126	1,263,978.18	225,818	138,326	87,492	1,133,236.33	239,533	144,126	95,407	1,161,623.37	666,182	257,025	3,558,837.88	

Source: SisReg/Sesa-ES.

A - scheduled; C - confirmed; Abs, - non-attendance Ag, Total - total scheduled; N - total non-attendance; Tx, Abs, - non-attendance rate,

Within the research period, the total number of scheduled specialized consultations grew from 200,831 in 2014 to 239,533 in 2016, in a 19.3% increase (*graph 1*), revealing an absolute growth stemming from orthopedic and ophthalmology specialties (*table 1*).

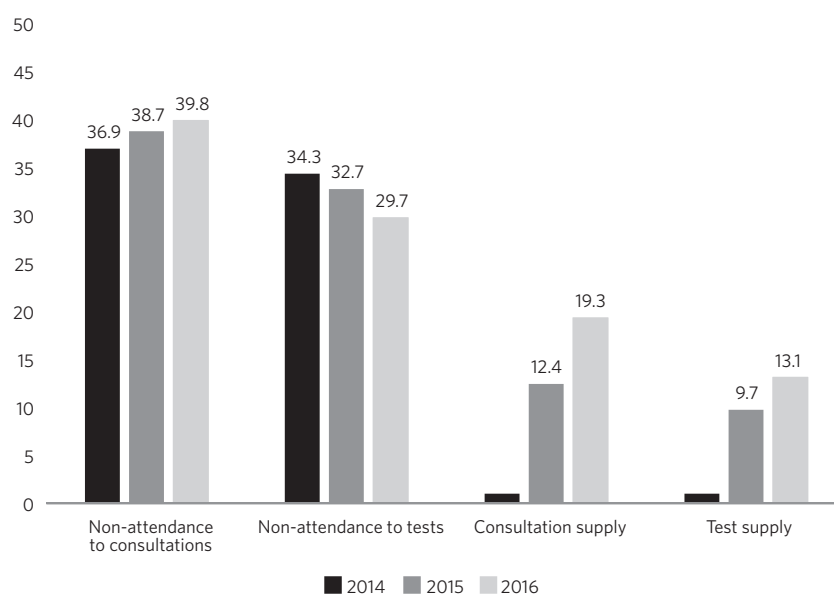
Non-attendance to specialized consultations increased by an average of 2.9% between 2014 and 2016. In 2014, scheduled specialized consultations totaled 200,831, while the non-attendance rate was equivalent to 36.9%, or 74,126 consultations. In 2015, scheduled

specialized consultations totaled 225,818, while non-attendance rate was equivalent to 38.7%, or 87,492 consultations. In 2016, scheduled specialized consultations totaled 239,533, while non-attendance rate was equivalent to 39.8%, or 95,407 consultations. That means that the non-attendance average rate was 38.6%, equivalent to a total of 257,025 missed consultations (*graph 1*).

The non-attendance average rate regarding

specialized tests was 32.1%, equivalent to 108,103 missed tests. Within the research period, 108,103 scheduled tests were missed, equivalent to R\$15,007,624.15 estimated waste (*table 2*). As for specialized tests, non-attendance rate has decreased annually, at a rate of 34.3% in 2014, 32.7% in 2015 and 29.7% in 2016. In contrast, supply grew 9.7% from 2014 to 2015, and 13.1% from 2015 to 2016 (*graph 1*).

Graph 1. Rates per non-attendance and offer of specialized exams and consultations within the Metropolitan Health Region, Espírito Santo State, Brazil. 2014-2016



Source: Authors based on SisReg/Sesa-ES data.

Within 2014 and 2016, 336,537 specialized tests were scheduled, while non-attendance rates related to extracorporeal lithotripsy tests ranged from 22.3% (CT diagnosis) to 100% (specialized therapies). Among diagnostic procedures (group 02), four tests showed non-attendance rates between 20.0% and 30.0%. The diagnosis by tomography of subgroup 02.06 showed the lowest non-attendance rate (22.3%), while examination by means of material collection of subgroup 02.01 presented the

highest one (28.2%). Non-attendance rates regarding the other four specialized tests of this group ranged between 30.0% and 40.0%. Among them, endoscopic diagnosis of subgroup 02.09 revealed the lowest rate (30.4%), and radiology diagnosis of subgroup 02.04, the highest rate (39.1%). Group 02 tests amounted to R\$13,774,088.92 estimated waste, equivalent to 91.8% of non-attendance total waste.

Procedures regarding group 04 – surgical procedures – showed non-attendance

rates between 30.0% and 70.0%. Vision apparatus surgery (subgroup 04.05) revealed the lowest non-attendance rate (34.5%), while upper airway, head and neck surgery (subgroup 04.04) showed the highest one

(66.7%). Groups 03 and 04 procedures totaled a waste of R\$1,233,535.23, or 8.2% of the total monetary waste totaled by groups 02, 03 and 04 of specialized tests, as compiled in *table 2*.

Table 2. Non-attendance description per specialized consultation within the Metropolitan Health Region, Espírito Santo State, Brazil. 2014-2016

2014				2015				2016				2014-2016		Waste	
A	C	Abs.	Value R\$	A	C	Abs.	Value R\$	A	C	Abs.	Value R\$	Ag. Total	Tx. Abs.	N (%)	Value (R\$)
02- DIAGNOSTIC PROCEDURES															
..02.01-Material collection															
1,354	927	427	142,603.39	1,330	979	351	121,878.46	1,391	1,018	373	123,153.30	4,075	1,151 (28.2)		387,635.15
..02.06-Diagnosis by tomography															
6,754	5,139	1,615	226,876.80	7,987	6,179	1,808	266,716.69	9,308	7,365	1,943	274,201.81	24,049	5,366 (22.3)		767,795.30
..02.08-Diagnosis by nuclear medicine in vivo															
4,419	3,211	1,208	370,829.93	3,599	2,825	774	254,287.46	3,499	2,631	868	258,294.61	11,517	2,850 (24.7)		883,412.00
..02.11-Diagnostic methods across specialties															
14,176	9,990	4,186	227,820.06	16,531	11,654	4,877	310,527.67	16,664	11,192	5,472	424,720.26	47,371	14,535 (30.7)		963,067.99
..02.04-Diagnosis by radiology															
27,771	15,325	12,446	432,363.23	26,833	16,408	10,425	427,419.72	23,274	15,692	7,582	363,127.38	77,878	30,453 (39.1)		1,222,910.33
..02.07-Diagnosis by MRI															
7,191	5,452	1,739	544,493.45	8,710	6,881	1,829	573,885.99	9,814	7,565	2,249	766,104.75	25,715	5,817 (22.7)		1,884,484.19
..02.05-Diagnosis by ultrasound															
28,601	18,511	10,090	989,998.75	30,988	19,542	11,446	1,097,388.01	32,368	22,578	9,790	927,641.32	91,957	31,326 (34.1)		3,015,028.08
..02.09-Diagnosis by endoscopy															
12,992	9,223	3,769	1,008,499.89	16,905	11,611	5,294	1,719,830.13	19,567	13,592	5,975	1,921,425.86	49,464	15,038 (30.4)		4,649,755.88
Total Diagnostic Procedures															
103,258	67,778	35,480	3,943,485.50	112,883	76,079	36,804	4,771,934.13	115,885	81,633	34,252	5,058,669.29	332,026	106,536 (32.1)		13,774,088.92
03- CLINICAL PROCEDURES															
..03.09-Specialized therapies															
1	-	1	172.00	-	-	-	-	-	-	-	-	-	1	1 (100.0)	172.00
Total Specialized Therapy procedures															
1	-	1	172.00	-	-	-	-	-	-	-	-	-	1	1 (100.0)	172.00
04- SURGICAL PROCEDURES															
..04.04-Upper airway, head and neck surgery															
2	1	1	48.42	-	-	-	-	1	-	1	48.42	3	2 (66.7)		96.84
..04.06-Circulatory system surgery															
-	-	-	-	-	-	-	-	37	15	22	56,588.62	37	22 (59.5)		56,588.62

Table 2. (cont.)

2014				2015				2016			2014-2016		Waste		
A	C	Abs.	Value R\$	A	C	Abs.	Value R\$	A	C	Abs.	Value R\$	Ag. Total	Tx. Abs.	Value (R\$)	
														N (%)	
04- SURGICAL PROCEDURES															
..04.05-Vison apparatus surgery															
991	700	291	213,393.62	1,476	916	560	452,180.71	2,003	1,312	691	511,103.44	4,470	1,542 (34.5)	1,176,677.77	
Total Surgical Procedures															
993	701	292	213,442.04	1,476	916	560	452,180.71	2,041	1,327	714	567,740.48	4,510	1,566 (34.7)	1,233,363.23	
Total															
104,252	68,479	35,773	4,157,099.54	114,359	76,995	37,364	5,224,114.84	117,926	82,960	34,966	5,626,409.77	336,537	108,103 (32.1)	15,007,624.15	

Source: Authors based on SisReg/Sesa-ES data.

A - scheduled; C - confirmed; Abs. - non-attendance; Ag. Total - total scheduled; N - total non-attendance; Tx. Abs. - non-attendance rate.

Discussion

Both in Brazil and abroad, studies on non-attendance to specialized healthcare appointments are emphatic in stating that it causes monetary losses, although few contain a reasoned approach on economic evaluation and analytical methods of services to estimate the values involved⁴. Therefore, this study pioneers in assigning monetary values to non-attendance of SUS users to scheduled procedures in the state of the ES.

Within the three years of the study, the estimated monetary waste accumulated in RSM-ES as a result of users' non-attendance to consultations, tests and other specialized procedures achieved R\$18,566,462.03, being table values updated for 2018. The results corroborate the existence of monetary losses as result of non-attendance, even if estimates are limited by the data available due to the existing administrative structures in the various management modalities, mainly as for public services, deeply restricting the analysis to just SUS Table.

Both the supply of consultations and tests and the non-attendance rate grew in the period, reinforcing the concern about the state management on the subject²⁸. Results show that non-attendance rates regarding

specialized consultations (38.6%) and tests (32.1%) in RSM-ES are high and consistent with other studies conducted in Brazil on specialized care. It confirms that non-attendance high rates are not only found in Espírito Santo State but also in São Paulo (34.4%)⁹, Florianópolis (34,4%)² and João Pessoa (39,8%)³, worrying managers and evincing that joint efforts to expand the supply of consultations are not working.

Non-attendance rate in respect of dental specialty for patients with special needs was zero, which, according to the Regulatory Center management, can be justified by the fact that the specialty inception occurred only in 2014 and by the possibility that low supply of vacancies generates a great expectation by the family members. According to their impairments, special patients are not cared by dental primary care but referred to specialized care instead. The surgical cancer specialty showed the lowest non-attendance rate (26.4%), which can be justified by the severity of the pathology previously diagnosed and by the need for rapid intervention.

General physiotherapist consultation showed the highest rate (75.8%), corroborating Dantas et al. systematic review⁷, who found the rate of 79.2%, the most frequent cause being locomotion limitations due to

chronic pathologies inherent to those diseases. The understanding is also in tune with the Regulatory Center management report, according to which absences can be justified by failure in the attendance record, by the pathology worsening or, in some cases, by improvement of the symptoms.

Diagnostic procedures, such as tomography and magnetic resonance imaging (CT and MRI), showed the lowest non-attendance rates – 22.3% and 22.7%, respectively. The lowest non-attendance rate of the group can be explained by the fact that these tests involve greater technological complexity and are, in theory, requested in cases of more specific clinic, requiring sophisticated tests to assist in the diagnosis and conduct. Although being lower, these non-attendance rates are significant, and the waste estimated values are high due to being tests of high technology, resulting in R\$2,652,279.49 waste, equivalent to 19.3% of group 02 total monetary waste. In the same group, it was observed that tests requiring lower technology, subgroup 04, the diagnosis by radiology, usually requested when clinic diagnosis is not well clear, are the ones showing the highest non-attendance rates (39.1%). High non-attendance rates can be explained by various reasons, among all we emphasize the long waiting list, causing the improvement or worsening of the symptoms, which makes the user look for emergency services or pay for the attendance in the private sector³⁹.

During the study, consultation supply increasing among the RSM-ES 20 municipalities revealed management efforts to implement the Regional Intervention Plan (PIR), inspired in the 2011 Regionalization Director Plan (PDR) of ES State, dividing the state into four health regions. PIR was influenced by Federal Decree n° 7,508, dated June 28, 2011, which regulated Federal Law n° 8,080/90 and reassured the need to reorganize care networks within those health regions^{19,33}.

The split in regions, here understood as the organizational guideline of SUS, leading the decentralization process of health actions

and services and the agreement between managers at the federal, state and municipal levels, aims to organize care networks that require different technological levels³⁴. It guided PPI implementation between the state and municipalities in the health region, absorbing the challenges regarding comprehensive care and responses to the population needs so to provide health services closer to the user, mainly for specialized care and high complexity³³.

The concept of integrality here adopted is the one advocated by Giovanella et al.³⁵, i.e., the guarantee of care in the three governmental levels of health care and the coordination among promotion, prevention and recovery actions, following Pinheiro concept³⁶. As for the latter author, integrality is a collective construction that improves its form and expression by means of the meeting of the different subjects involved in the production of care and in the defense of life.

Specialized care is considered a shield for good performance and improvement in health system quality, and may become a critical node of highest complexity. Therefore, managers and researchers consider it a challenge to achieve integrality as a SUS guideline^{23,37}. As stated by Mendes³⁸, in order to achieve integrality, it is need do link assistance and integration of services by means of regionalized and hierarchical health networks due to the difficulty in carrying all resources and competences for the solution of all health problems of a population. During the study period, ES networks were not yet defined. Its implementation began in September 2017 in the northern region of the state, being three networks implemented in 2018.

As a way to organize the flow among the three governmental levels of care, access regulation is considered a valuable management tool, because it creates a balance between demand, supply and financing²⁷. Increasing non-attendance rates in RSM-ES indicate that, despite the increase in the supply of controlled vacancies, non-attendance actually

contributed to reduce access to specialized care, evincing missed assistance opportunities and contributing to increase the waiting list for procedures⁹.

Access to medium complexity is understood here as the opportunity to seek and obtain adequate health services to the user needs³⁸. The expansion of access to actions and services is one of SUS great challenges and requires managers to organize and create mechanisms aimed at consolidating the system²³. It is possible to understand that access goes beyond the use of the health system. It is a concept of multiple dimensions, composed of financial and non-financial factors, which can vary over time with the evolution and emergence of the society needs³⁹.

The challenges for offering specialized care in RSM-ES are great due to its characteristics. The reality of the 20 municipalities differs much. In eight of them, the population is around 15,000 inhabitants while in other four it exceeds 300,000 inhabitants, thus generating large differences in relation to investments in health care. Some municipalities have only basic services, evidencing the need to organize specialized care in health networks among municipal and state systems within the region³³. Specialized care is strategic and necessary to yield effectiveness and continuity to primary care, also acting as a complement and providing specialized assistance to those who need the service⁴⁰. Thus, non-attendance in specialized care is a constant concern for managers both because of carelessness and wastefulness^{2,9}.

Specialized care costs are high and include procedures of higher technology, so-called specialized technologies⁴¹. Among researches on the subject carrying stronger methodologies, from the standpoint of economic evaluation, we can detach a retrospective cohort in Texas, USA, from 1997 to 2008, whose analysis included direct and indirect costs for various health services. The average cost per non-attendance patient

was \$196.00 as per 2008⁴². In Brazil, scarce are the studies revealing non-attendance wasted values, but we can note a survey conducted in a public hospital in the city of Uberlândia, State of Minas Gerais, that, in 2011, identified a loss of R\$1.1 million per year by accounting non-attending procedures as per SUS Table values⁴³.

It was only possible to take knowledge of the non-attendance data in the RSM-ES, made available by Sesa-ES, due to the existence of SisReg-ES. Data recording in the system is fault-prone, not allowing to identify whether non-attendance occurred only due to user-related problems or if it was also worsened by management reasons. Sesa-ES has already identified the overestimated data as a problem, because, in some procedure premises, the system does not receive any input informing that the procedure was performed, which jeopardizes the data since the system records as a non-attendance procedure³³.

In view of repeated mistakes in the attendance system recording in the various procedure premises, including in its own services, Sesa-ES adopted administrative measures to meet the need for adequacy of the Record (scheduling key) as for all SUS users serviced via SisReg. Thus, on November 20, 2018, the Diário Oficial newspaper published Ordinance n° 084-R/2018 regulating the mandatory input in SisReg of the procedures performed, as well as its daily updating. The intention behind the measure is to obtain more accurate data on the user care.

Limitations of this study include the fragility of SisReg-ES database due to the non-input in the system of care performed, generating a higher rate of non-attendance. Another limitation was the lack of economic analysis per procedure premise hindering the actual data about cost per procedure. Available data does not allow to state that all the values are actually a waste, owing the peculiarities in monetary disbursement for services provided by RSM-ES' different management modalities: federal and state public services, philanthropic

services, private services and public services managed by OS. The cost calculated per procedure premise would enhance the study with a more accurate waste amount.

Causes of non-attendance are diverse and related to the management, the user and the worker. However, a study conducted on specialized care in Spain analyzed these issues and concluded that the percentage of preventable causes is 52,4%⁶. That suggests that there is plenty of room for correction efforts. Therefore, a future individualized analysis of non-attendance behavior for each specialty may justified to support these efforts.

Conclusions

The non-attendance of users is a chronic problem also in the Brazilian health system as worldwide, what can hinder the SUSustainability of the specialized service supply broadening. Specialized care non-attendance is increasing in RSM-ES, causing losses to public management and to users, mainly because of the social damage it entails. It is noteworthy that non-attendance rates and monetary values found by the research are significant data for the public health system.

It is suggested that the causes of non-attendance related to management and user particularities be sought so to propose viable reduction measures, such as strengthening of the primary care as the user's gateway; improvement of the regulatory system;

implementation of regionalized and hierarchical health care networks; and others. The integrality of care is known as one of the hugest SUS challenges, demanding groundbreaking measures capable of promoting more and more not only a humanized care but also committed to life.

Cost-per-service data is an important information that helps manager decisions on investments and priorities, supporting the greater efficiency in health spending. Thus, it can be concluded that optimizing the available resources and fighting against the waste without jeopardizing the quality of care is and will be a constant challenge in the agenda of SUS managers today and in the coming years.

Collaborators

Beltrame SM (0000-0002-0755-5565)* contributed in the designing, planning, methodology and final wording. Oliveira AE (0000-0001-5160-3280)* contributed in the designing, planning, data analysis, and in the preparation and critical review of the preliminary and final versions of the manuscript. Santos MAB (0000-0002-7547-3537)* contributed in the designing, analysis, preparation of the text and in the revision of the final document. Santos Neto ET (0000-0002-7351-7719)* contributed in the designing, planning, data analysis, and in the preparation and critical review of the preliminary and the final versions of the manuscript ■

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