Regionalization of psychosocial care: a panoramic view of the Psychosocial Care Network of Minas Gerais state, Brazil

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Abstract *The present study aims at analyzing the regionalization of the services carried out by the Psychosocial Care Network (RAPS in Portuguese) in the state of Minas Gerais (MG) in Brazil, yielding indicators that may enhance the SUS strategic management towards the strengthening of the psychosocial care provided by the state. It is a cross-sectional study, based on the data collected in May 2019 from government websites, considering the state's Macro-Regions and Health Regions as units of analysis. Indicators of service coverage in relation to the population in accordance to normative parameters determined by the Ministry of Health for a better understanding of the effective coverage were produced, and a general indicator (iRAPS) of the supply of services in this network in Minas Gerais state was validated. The outcomes allow a detailed analysis of the structural aspect of the RAPS in MG and unveil the development of a robust network. However, important regional heterogeneities were noticed and also a lack of services aiming at specific populations providing assistance 24 hours a day, which weakens the proper access to RAPS in several parts of the state. Higher values of iRAPS were found in health regions with low socioeconomic development and low general offer of health services, a fact that differs from the national scenario, which may imply state policy investments aiming at offering RAPS within the state hinterland areas.*

Key words *Mental health, Mental health assistance, Regionalization, Networks community health, National Health Systems*

Introduction

In the context of major demographic, environmental and socio-political transitions, the global burden of disease attributable to mental disorders has increased in recent years worldwide, being estimated at 13% before the COVID-19 pandemic[1] which increased mental disease personal, social and economic costs to unprecedented magnitude. Thus, it is necessary that public mental health systems be strengthened to deal with this demand[2].

The development of a National Mental Health Policy (PNSM in Portuguese) in Brazil started in the 1980s, driven by social movements and staking on a community care model. There have been several advances linked to the improvement of territorial services and clinical practices based on psychosocial care in the last 30 years, leading the Brazilian performance into a prominent rank in the field of global mental health[3].

At the same time, measures aiming at the regionalization of health care have been taken, yielding the definition of decentralized responsibilities and shared tools for planning management and funding, aiming to reduce the fragmentation of the Unified Health System (SUS in Portuguese) and overcome the inequalities that mark the Brazilian territory[4]. This organizational arrangement was recently enhanced due to the structuring of Health Care Networks (RAS in Portuguese) which integrate actions and services of different technological densities and levels of complexity[5]. This proposal consolidates the Health Region (RS in Portuguese) in contrast to the municipal-centered model in force to date, as a continuous territorial side view, consisting of groups of neighboring cities, with similar cultural, economic and social characteristics and sharing communication networks and infrastructure[6]. In this context, in 2011, the Psychosocial Care Network (RAPS in Portuguese) was defined as one of the priority thematic networks aiming at the integration of mental health in the various SUS care points[7].

This process has been getting into consolidation in the last years. However, it is noticeable that there is a lack of data that would allow its monitoring and evaluation. Until 2015, the Ministry of Health (MS in Portuguese) used to publish periodically the bulletin "Mental Health in Data"[8]. However, since that time, data on the PNSM and the services implemented in the country are limited. Furthermore, in 2017, after changes in the federal government political direction, the so-called new PNSM[9] was launched. The advocated changes are worrisome, as they break with the tradition of being in agreement with social instances historically involved in its construction. Furthermore, the inclusion of the psychiatric hospital and the mental health ambulatory facility in the list of RAPS components, the replacement of beds in general hospitals by specialized wards holding up to 30 beds, disregarding the installed capacity and municipal needs, and the maintenance and the funding of therapeutic communities reinforce a logic of specialization and hospital-centeredness[10-12].

This concern is enhanced when we realized that in recent years, the Brazilian public health has been going through a reduction of funds and a setback in the pace of services supply, because of changes in the direction of national policy and the financial crisis[13]. These facts are made worse by the recent intention of the federal government to revoke laws that support the funding and operation of the RAPS, weakening the progress already achieved[14] and reinforcing the need for critical analysis of the dynamics of the provision of services in the field of mental health[10-12,15].

Recent studies[16,17] that analyzed the distribution of RAPS services nationwide demonstrate its expansion and regionalization, especially in small and medium-sized cities. On the other hand, they point to the existence of care gaps mainly linked to the difficulty of collaboration among the cities and to underfunding. The importance of these works is brought into light, considering that most publications on the RAPS construction process are qualitative studies of municipal or regional contexts[18,19]. As highlighted by Mello[20], the mismatch between the development of public policies and scientific research is a common fact, not only in Brazil, but also in the international community, and the recent dismantling of the Canadian regional health processes would have been justified precisely because of the lack of scientific evidence on the instituted policies. Therefore, this study aims to analyze the regionalization of RAPS services in the state of Minas Gerais, generating evidence and indicators that can enhance the strategic management of the SUS towards the strengthening of the state's psychosocial care.

Methodology

A cross-sectional study on the RAPS services, having the macro-regions and health regions

(RS), as units of analysis was carried out in the state of Minas Gerais. Information was collected from the following sources: government database (DATASUS and e-GESTORab) and a direct request to the National Coordination of Mental Health in May 2019 and reconstructed according to the platform Regions and Networks[21], in order to include in a list the 853 cities in the state, organized into 13 health macro-regions and 77 RS. The option to use the division of the state as proposed by this platform was based on its coincidence with what was established in the Master Plan for Regionalization of MG state[22] and on the possibility of standardization and subsequent comparison of the results of regional structuring of RAPS in MG with the typologies established by Viana *et al.*[23] that stratify Brazilian RSs according to the socioeconomic development and the supply and complexity of health services in each regional context. The stratification by population size was based on the classification of cities into the categories: small size = less than 50,000 inhabitants; medium small size = from 50,000 to 99,999 inhabitants; medium size = from 100,000 to 299,999 inhabitants; medium-large = from 300,000 to 499,999 inhabitants and large size = above 500,000 inhabitants[24].

After organizing the data in a single database, indicators were determined based on the number of services in relation to the population, according to the estimate made by the e-Gestor with reference to July 1st of the previous year[25], so as to better understand the scope of the coverage provided in each unit of analysis. The calculation of indices was performed considering the highest level of coverage in each offered service, as detailed below.

The Psychosocial Care Center Index (CAPS in Portuguese) was calculated similarly to the CAPS/100,000 inhabitant indicator, already widely used by the MS[8]. The criteria for funding this service establish: CAPS I more than 15 thousand inhabitants, CAPS II, CAPS AD (alcohol and drugs) and CAPSi (infant and youth): more than 70 thousand inhabitants, CAPS III and CAPS ADIII: over 150 thousand inhabitants[26]:

$$iCAPS = 100.000 \; x \; \frac{\substack{(CAPS\ 1\ x\ 0,5)\ + \\ CAPS\ II\ + \\ (CAPS\ III\ x\ 1,5)\ + \\ CAPSi\ +\ CAPSad\ + \\ (CAPSad\ III\ x\ 1,5)}}{Population}$$

The Expanded Family Health Center (NASF in Portuguese) Index was calculated considering modalities I, II and III with maximum coverage in each of them, that is, 9 eSF, 4 eSF and 2 eSF, respectively, and that each team attends up to 3,450 inhabitants[27-29].

$$iNASF = \frac{\substack{(NASF\ 1\ x\ 31.050)\ + \\ (NASF\ II\ x\ 13.800)\ + \\ (NASF\ III\ x\ 6.900)}}{Population}$$

The Psychosocial Beds in General Hospitals (LHG in Portuguese) Index was calculated considering the value determined by the MS of 1 bed for every 23 thousand inhabitants[26].

$$iLHG = \frac{Number\ of\ beds\ x\ 23.000}{Population}$$

The Family Health Strategy (ESF in Portuguese) Index, widely used by the MS as well, was calculated considering the population covered by such service and the total population[29].

$$iESF = \frac{Population\ covered}{Total\ population}$$

Finally, the RAPS Index (iRaps), the methodological construct of this study, was calculated as a general index of service implementation in RAPS in MG state:

$$iRAPS = \frac{iCAPS + iNASF + iLHG + iESF}{4}$$

For a better visualization of the iRAPS distribution in the analysis units, maps were produced using the QGis software. Statistical analyzes were performed using the Statistical Package for the Social Sciences for Windows (SPSS) software. The non-parametric Kruskal & Wallis test was applied in order to analyze whether the indicators present significant differences by the units of analysis. The Principal Component Analysis (PCA) was applied to validate the iRAPS and analyze its relationship with the other indicators. The Spearman's Correlation Test was applied to analyze the interaction of iRAPS in RS segmented by the typology of Viana *et al.*[23], by the presence or absence of 3 RAPS attention points and by population density.

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The present study constitutes an initial part of an evaluative research on the implementation of RAPS in the state of Minas Gerais, it was approved by the Ethics Committee in Research involving Human Beings (CAAE: 77798217.1.3001.5091) and is funded by the Foundation for Research Support of MG (FAPEMIG in Portuguese).

Results

Minas Gerais is the second most populous state in the federation (21,040,662 inhab.); it has the fourth largest territorial area (557,448.8 km²) and 853 cities, whereas 91.68% of them hold less than 50,000 inhabitants[25].

Table 1 shows the distribution of RAPS components throughout macro-regions, RS and population size of the cities of MG. It is noticed that the ESF coverage in the state is close to 80%, and the coverage of Primary Health Care services (ESF and NASF) in small towns is higher than in other cities, bringing into evidence the presence of these services in the state hinterland. Regarding CAPS, in their various modalities, it shows that 369 CAPS were implemented in MG by 2019. Out of these, most are CAPS I, as expected by the prevalence of small cities in MG, present

Table 1. Distribution of RAPS components by Macroregion, Health Region and population size of the cities. Minas Gerais, 2019.

Macroregion/ Health Region	Population	ESF		NASF	ECR	CAPS						UAA	UAI	SRT	LHG
		N	Coverage			I	II	III	Inf.	AD	AD III				
Center	**6,611,614**	**1,573**	**74.45%**	**220**	**5**	**18**	**18**	**13**	**18**	**9**	**3**	**1**	**1**	**41**	**65**
Belo Horizonte	3,392,868	780	72.65%	112	4	1	5	10	7	2	2	1	1	38	14
Betim	718,033	189	73.53%	18	0	3	2	2	2	0	1	0	0	0	4
Contagem	870,154	179	70.18%	18	1	1	3	1	2	2	0	0	0	3	10
Curvelo	184,886	53	88.15%	12	0	2	1	0	0	0	0	0	0	0	5
Guanhães	115,303	41	92.90%	11	0	3	0	0	0	0	0	0	0	0	1
Itabira	235,932	71	93.18%	10	0	3	1	0	1	1	0	0	0	0	6
Itabirito	185,417	46	85.59%	4	0	2	1	0	3	1	0	0	0	0	10
João Monlevade	138,981	30	69.54%	2	0	1	1	0	0	0	0	0	0	0	1
Sete Lagoas	445,727	110	74.31%	25	0	1	1	0	1	1	0	0	0	0	14
Vespasiano	324,313	74	74.80%	8	0	1	3	0	2	2	0	0	0	0	0
Central South	**787,099**	**219**	**81.72%**	**53**	**1**	**4**	**3**	**1**	**2**	**4**	**0**	**0**	**0**	**32**	**22**
Barbacena	237,652	61	75.04%	17	1	0	0	1	1	1	0	0	0	30	14
Conselheiro Lafaiete	309,780	91	84.51%	20	0	2	2	0	1	2	0	0	0	2	7
São João del Rei	239,667	67	84.73%	16	0	2	1	0	0	1	0	0	0	0	1
Jequitinhonha	**295,599**	**108**	**99.06%**	**19**	**0**	**4**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**2**	**14**
Diamantina	170,773	63	98.38%	9	0	1	1	0	0	0	0	0	0	0	7
Minas Novas	124,826	45	100.00%	10	0	3	0	0	0	1	0	0	0	2	7
East	**1,538,706**	**462**	**82.70%**	**102**	**2**	**18**	**5**	**0**	**4**	**3**	**0**	**1**	**1**	**0**	**26**
Caratinga	202,519	68	93.87%	13	0	2	1	0	2	1	0	0	0	0	0
Coronel Fabriciano	230,586	53	66.28%	9	0	2	1	0	1	0	0	0	0	0	0
Governador Valadares	429,224	125	83.65%	34	1	1	1	0	1	1	0	1	0	0	10
Ipatinga	415,912	120	76.81%	19	1	4	2	0	0	0	0	0	0	0	11
Mantena	69,963	27	99.94%	8	0	2	0	0	0	1	0	0	1	0	0
Resplendor	89,305	31	95.97%	8	0	4	0	0	0	0	0	0	0	0	5
Santa Maria do Suaçuí	101,197	38	94.32%	11	0	3	0	0	0	0	0	0	0	0	0

in all RS, showing that the specialized psychosocial care is also being taken into the hinterland of MG state.

It can be noticed that the implementation of the Street Clinic Teams (ECR) and the Transitory Reception Units (UAA and UAI) is still initial in MG. Regarding Therapeutic Residential Services (SRT), 118 units were implemented, with a concentration in the capital (Belo Horizonte, 30.5%) and in other cities where the state's psychiatric hospitals were located.

A total of 385 Psychosocial Beds in General Hospitals (LHG) were identified in the state, with large differences in implementation between the macro-regions and RS, with most beds located in small cities, followed by medium-sized ones, evidencing the process of taking LHGs into the state hinterland as well.

Table 1. Distribution of RAPS components by Macroregion, Health Region and population size of the cities. Minas Gerais, 2019.

Macroregion/ Health Region	Population	ESF		NASF	ECR	CAPS						UAA	UAI	SRT	LHG
		N	Coverage			I	II	III	Inf.	AD	AD III				
Southern East	**693,810**	**241**	**94.22%**	**51**	**0**	**12**	**4**	**0**	**2**	**1**	**0**	**0**	**0**	**1**	**18**
Manhuaçu	344,129	117	95.33%	23	0	8	1	0	2	1	0	0	0	1	8
Ponte Nova	211,941	77	93.04%	17	0	1	2	0	0	0	0	0	0	0	0
Viçosa	137,740	47	93.26%	11	0	3	1	0	0	0	0	0	0	0	10
Northeast	**922,509**	**334**	**99.76%**	**66**	**1**	**19**	**3**	**0**	**3**	**5**	**0**	**0**	**0**	**1**	**28**
Águas Formosas	59,577	24	100.00%	8	0	1	1	0	0	1	0	0	0	0	2
Almenara	182,042	67	99.81%	16	0	6	0	0	1	0	0	0	0	0	7
Araçuaí	89,680	35	100.00%	6	0	1	1	0	0	1	0	0	0	1	4
Itaobim	80,974	29	97.66%	4	0	2	0	0	1	1	0	0	0	0	2
Nanuque	68,531	23	100.00%	2	0	1	0	0	0	0	0	0	0	0	0
Padre Paraíso	62,685	23	100.00%	4	0	2	0	0	0	0	0	0	0	0	1
Pedra Azul	53,880	22	100.00%	4	0	3	0	0	0	1	0	0	0	0	0
Teófilo Otoni	325,140	111	100.00%	22	1	3	1	0	1	1	0	0	0	0	12
Northwest	**701,605**	**195**	**82.66%**	**32**	**0**	**8**	**1**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**
João Pinheiro	74,336	17	73.05%	3	0	1	0	0	0	0	0	0	0	0	0
Patos de Minas	354,781	109	91.87%	21	0	4	1	0	0	1	1	0	0	0	0
Unaí	272,488	69	73.30%	8	0	3	0	0	0	0	0	0	0	0	0
North	**1,676,413**	**637**	**98.49%**	**97**	**2**	**20**	**6**	**1**	**5**	**4**	**1**	**1**	**1**	**1**	**40**
Brasília de Minas	247,070	98	99.11%	17	0	4	1	0	0	1	1	0	0	0	0
Coração de Jesus	47,598	22	100.00%	5	0	1	0	0	0	0	0	0	0	0	3
Francisco Sá	74,267	28	100.00%	6	0	3	0	0	0	0	0	0	0	0	6
Janaúba	277,581	117	100.00%	21	1	3	1	1	2	0	0	0	1	0	8
Januária	115,906	35	85.53%	5	0	2	1	0	0	0	0	0	0	0	0
Manga	57,099	25	100.00%	5	0	1	0	0	0	0	0	0	0	0	0
Montes Claros	503,206	171	98.99%	11	1	1	1	0	1	2	0	1	0	1	20
Pirapora	146,345	48	99.16%	8	0	3	0	0	1	1	0	0	0	0	0
Salinas	207,341	93	100.00%	19	0	2	2	0	1	0	0	0	0	0	3
West	**1,289,538**	**331**	**80.82%**	**60**	**0**	**16**	**5**	**2**	**2**	**4**	**1**	**0**	**0**	**1**	**1**
Bom Despacho	106,982	33	99.08%	8	0	1	1	0	0	0	0	0	0	0	0
Divinópolis	475,387	95	65.15%	13	0	5	0	1	0	0	1	0	0	1	1
Formiga	131,350	41	93.23%	10	0	3	1	0	0	0	0	0	0	0	0
Itaúna	123,297	32	83.69%	3	0	1	1	0	0	2	0	0	0	0	0
Pará de Minas	248,119	60	79.21%	11	0	1	2	0	0	2	0	0	0	0	0
Santo Antônio do Amparo	204,403	70	99.94%	15	0	5	0	1	2	0	0	0	0	0	0

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Macroregion/ Health Region	Population		ESF		NASF	ECR	CAPS						UAA	UAI	SRT	LHG
			N	Coverage			I	II	III	Inf.	AD	AD III				
Southeast	**1,668,069**		**428**	**76.89%**	**85**	**1**	**21**	**4**	**1**	**3**	**3**	**2**	**1**	**0**	**29**	**71**
Além Paraíba	57,258		16	80.22%	4	0	2	0	0	0	0	0	0	0	0	1
Carangola	128,433		43	98.01%	10	0	4	0	0	1	1	0	0	0	0	9
Juiz de Fora	687,734		139	64.87%	18	1	3	2	0	1	1	0	0	0	24	32
Leopoldina	182,689		51	88.44%	11	0	3	0	1	0	1	0	0	0	1	8
Muriaé	173,744		60	98.59%	16	0	3	1	0	0	0	1	1	0	0	8
Santos Dumont	50,757		15	89.84%	0	0	1	0	0	0	0	0	0	0	0	0
São João Nepomuceno	72,807		22	85.48%	5	0	1	0	0	0	0	0	0	0	0	0
Ubá	314,647		82	71.20%	21	0	4	1	0	1	0	1	0	0	4	13
South	**2,779,095**		**705**	**77.38%**	**114**	**4**	**26**	**12**	**0**	**3**	**8**	**1**	**0**	**2**	**9**	**44**
Alfenas	322,017		82	83.04%	11	0	3	0	0	0	0	0	0	0	7	0
Guaxupé	161,041		46	85.03%	6	0	2	0	0	0	0	0	0	0	0	0
Itajubá	194,918		48	75.00%	9	0	1	2	0	0	0	0	0	0	0	0
Lavras	183,347		39	66.40%	4	0	1	2	0	0	1	0	0	0	2	0
Passos	291,393		79	82.69%	20	1	2	2	0	0	2	0	0	0	0	2
Poços de Caldas	233,732		48	68.79%	9	1	1	1	0	0	1	0	0	1	0	8
Pouso Alegre	546,879		143	77.36%	16	1	5	1	0	0	1	0	0	0	0	15
São Lourenço	262,449		86	91.02%	20	1	5	1	0	1	0	1	0	1	0	5
São Sebastião do Paraíso	125,578		39	92.73%	8	0	1	1	0	1	1	0	0	0	0	1
Três Corações	132,728		33	79.53%	4	0	1	1	0	0	1	0	0	0	0	1
Três Pontas	125,199		25	58.68%	5	0	1	1	0	0	0	0	0	0	0	12
Varginha	199,814		37	59.62%	2	0	3	0	0	1	1	0	0	0	0	0
Northern Triangle	**1,294,816**		**222**	**56.87%**	**36**	**1**	**6**	**5**	**1**	**1**	**1**	**2**	**0**	**1**	**0**	**50**
Ituiutaba	194,570		41	63.51%	7	0	1	1	0	0	0	0	0	0	0	0
Patrocínio	194,398		49	84.79%	11	0	2	1	0	0	0	1	0	0	0	15
Uberlândia	905,848		132	49.45%	18	1	3	3	1	1	1	1	0	1	0	35
Southern Triangle	**781,789**		**139**	**59.79%**	**23**	**1**	**4**	**4**	**0**	**2**	**3**	**0**	**0**	**0**	**1**	**6**
Araxá	187,136		36	63.86%	5	0	1	1	0	1	1	0	0	0	0	0
Frutal	179,694		34	64.88%	8	0	1	1	0	0	1	0	0	0	0	0
Uberaba	414,959		69	55.74%	10	1	2	2	0	1	1	0	0	0	1	6
Minas Gerais	**21,040,662**		**5,594**	**78.97%**	**958**	**18**	**176**	**71**	**19**	**45**	**47**	**11**	**4**	**6**	**118**	**385**
Population Size of Cities of MG																
Capital	2,501,576		613	76.57%	95	4	0	0	9	4	0	2	1	1	36	10
Hinterland	PP	8,631,633	2,977	93.36%	670	1	161	11	1	11	11	2	3	2	20	200
	MPP	2.832.805	653	77.72%	70	1	13	27	2	10	16	1	0	1	1	53
	MP	1.941.838	364	64.25%	40	4	1	14	1	9	11	2	0	1	34	41
	MGP	3.226.183	686	66.98%	61	6	1	14	4	8	7	3	0	1	3	39
	GP	1.906.627	301	54.10%	22	2	0	5	2	3	2	1	0	0	24	42

ESF: Family Health Strategy, NASF: Expanded Family Health Center, ECR: Street Clinic Team, CAPS: Psychosocial Care Center, UAA: Transitory Reception Units for adults, UAI: Transitory Reception Unit for child - youth, SRT: Therapeutic Residential Service, LHG: Psychosocial Beds in General Hospital; PP: small size - up to 50.000 hab.; MPP: small medium size - 50.000-100.000 hab.; MP: medium size - 100.000-300.000 hab.; MGP: medium large size - 300.000-500.000 hab.; GP: large size - over 500.000 hab.

Source: Authors.

Table 2 presents the summary of indicators generated by macro-regions and RS as well as the distribution of RS according to the typology proposed by Viana *et al.*[23]. As the indicators were built taking into account the coverage stipulated by the MS, values greater than or equal to 1 indicate that the region has a quantity of services as determined by federal regulations. Statistically, it was found that there is a difference between the values of all indicators, according to the health macro-regions (Table 3), demonstrating a heterogeneity in the implementation of RAPS services in MG. The Principal Component Analysis (PCA) showed that iRAPS can be used as a composite representative of the other indices, that is,

the macro-regions and RS of MG are better represented by this single indicator, which validates it.

It is observed that the macro-regions Jequitinhonha, Eastern part of the South, Northeast and North stand out with the best indicators in the state, despite having most of their RS classified in Group 1 and, therefore, presenting lower socioeconomic status and less offer of general health care services. The Jequitinhonha region also stands out for being the only macro-region of MG that has an iLHG greater than 1. In this sense, it is observed that this component of RAPS is the one with the worst implantation in MG and that the Northwest macro-region, which has 700,000 inhab., does not have LHG.

Table 2. Indicators and Groups by Macroregion and Health region. Minas Gerais, 2019.

Macroregion/ Health Region	iESF	iNASF	iCAPS	iLHG	iRAPS	Group	Macroregion/ Health Region	iESF	iNASF	iCAPS	iLHG	iRAPS	Group
Center	**0.74**	**0.89**	**1.18**	**0.23**	**0.76**		**Jequitinhonha**	**0.99**	**1.31**	**1.35**	**1.09**	**1.19**	
Belo Horizonte/ Nova Lima/ Caeté	0.73	1.00	0.96	0.09	0.69	5	Diamantina	0.98	1.01	0.88	0.94	0.95	1
Betim	0.74	0.73	1.39	0.13	0.75	3	Minas Novas/ Turmalina/ Capelinha	1.00	1.71	2.00	1.29	1.50	1
Contagem	0.70	0.64	1.03	0.26	0.66	4	**East**	**0.83**	**1.17**	**1.36**	**0.39**	**0.94**	
Curvelo	0.88	1.18	1.08	0.62	0.94	2	Caratinga	0.94	1.29	2.47	0.00	1.18	1
Guanhães	0.93	1.26	1.30	0.20	0.92	1	Coronel Fabriciano/ Timóteo	0.66	0.64	1.30	0.00	0.65	3
Itabira	0.93	0.86	1.91	0.58	1.07	4	Governador Valadares	0.84	1.37	0.82	0.54	0.89	3
João Monlevade	0.70	0.32	1.08	0.17	0.57	3	Ipatinga	0.77	1.05	0.96	0.61	0.85	3
Ouro Preto	0.86	0.67	3.24	1.24	1.50	4	Mantena	1.00	1.68	2.86	0.00	1.38	1
Sete Lagoas	0.74	1.03	0.79	0.72	0.82	3	Resplendor	0.96	1.24	2.24	1.29	1.43	1
Vespasiano	0.75	0.69	2.31	0.00	0.94	3	Santa Maria do Suaçuí/São João Evangelista	0.94	1.33	1.48	0.00	0.94	1
Central South	**0.82**	**1.13**	**1.59**	**0.64**	**1.04**		**Northeast**	**1.00**	**1.48**	**2.22**	**0.70**	**1.35**	
Barbacena	0.75	1.29	1.47	1.35	1.22	3	Águas Formosas	1.00	1.56	4.20	0.77	1.88	1
Conselheiro Lafaiete/ Congonhas	0.85	1.24	1.94	0.52	1.13	3	Almenara	1.00	1.71	2.20	0.88	1.45	1
São João del Rei	0.85	0.83	1.25	0.10	0.76	3	Araçuaí	1.00	1.50	2.79	1.03	1.58	1
Eastern South	**0.94**	**1.34**	**1.87**	**0.60**	**1.19**		Itaobim	0.98	1.32	3.70	0.57	1.64	1
Manhuaçu	0.95	1.40	2.32	0.53	1.30	1	Nanuque	1.00	0.65	0.73	0.00	0.60	2
Ponte Nova	0.93	1.17	1.18	0.00	0.82	1	Padre Paraíso	1.00	1.71	1.60	0.37	1.17	1
Viçosa	0.93	1.45	1.82	1.67	1.47	3	Pedra Azul	1.00	1.98	4.64	0.00	1.91	1

Table 2. Indicators and Groups by Macroregion and Health region. Minas Gerais, 2019.

Macroregion/ Health Region	iESF	iNASF	iCAPS	iLHG	iRAPS	Group	Macroregion/ Health Region	iESF	iNASF	iCAPS	iLHG	iRAPS	Group
Southeast	**0.77**	**0.74**	**1.50**	**0.98**	**1.00**		Teófilo Otoni/ Malacacheta/ Itambacuri	1.00	1.42	1.38	0.85	1.16	1
Além Paraíba	0.80	1.02	1.75	0.40	0.99	3	**Northwest**	**0.83**	**0.86**	**1.07**	**0.00**	**0.69**	
Carangola	0.98	1.18	3.11	1.61	1.72	1	João Pinheiro	0.73	0.79	0.67	0.00	0.55	2
Juiz de Fora/ Lima Duarte/ Bom Jardim de Minas	0.65	0.25	0.80	1.07	0.69	5	Patos de Minas	0.92	1.12	1.55	0.00	0.90	3
Leopoldina/ Cataguases	0.88	1.00	2.19	1.01	1.27	3	Unaí	0.73	0.54	0.55	0.00	0.46	2
Muriaé	0.99	1.87	2.30	1.06	1.55	3	**North**	**0.98**	**1.18**	**1.67**	**0.55**	**1.09**	
Santos Dumont	0.90	0.00	0.99	0.00	0.47	3	Brasília de Minas/São Francisco	0.99	1.52	2.23	0.00	1.18	1
São João Nepomuceno / Bicas	0.85	0.57	0.69	0.00	0.53	3	Coração de Jesus	1.00	1.38	1.05	1.45	1.22	1
Ubá	0.71	0.96	1.75	0.95	1.09	3	Francisco Sá	1.00	1.72	2.02	1.86	1.65	1
South	**0.77**	**0.79**	**1.35**	**0.36**	**0.82**		Janaúba/Monte Azul	1.00	1.80	2.16	0.66	1.41	1
Alfenas/ Machado	0.83	0.73	0.47	0.00	0.51	3	Januária	0.86	0.89	1.73	0.00	0.87	1
Guaxupé	0.85	0.69	0.62	0.00	0.54	3	Manga	1.00	1.99	0.88	0.00	0.97	1
Itajubá	0.75	0.88	1.28	0.00	0.73	3	Montes Claros/ Bocaiúva	0.99	0.27	0.89	0.91	0.77	3
Lavras	0.66	0.45	1.91	0.00	0.76	3	Pirapora	0.99	1.13	2.39	0.00	1.13	2
Passos/Piumhi	0.83	1.23	1.72	0.16	0.98	3	Salinas/ Taiobeiras	1.00	1.83	1.93	0.33	1.27	1
Poços de Caldas	0.69	0.94	1.07	0.79	0.87	5	**West**	**0.81**	**1.02**	**1.82**	**0.02**	**0.92**	
Pouso Alegre	0.77	0.53	0.82	0.63	0.69	3	Bom Despacho	0.99	1.55	1.40	0.00	0.99	3
São Lourenço	0.91	1.28	2.29	0.44	1.23	3	Divinópolis/ Santo Antônio do Monte	0.65	0.65	1.16	0.05	0.63	3
São Sebastião do Paraíso	0.93	1.32	2.79	0.18	1.30	3	Formiga	0.93	1.42	1.90	0.00	1.06	3
Três Corações	0.80	0.49	1.88	0.17	0.84	3	Itaúna	0.84	0.48	2.84	0.00	1.04	3
Três Pontas	0.59	0.83	1.20	2.20	1.20	3	Pará de Minas	0.79	1.08	1.81	0.00	0.92	2
Varginha	0.60	0.31	1.75	0.00	0.66	5	Santo Antônio do Amparo/ Campo Belo	1.00	1.59	2.94	0.00	1.38	1
Southern Triangle	**0.60**	**0.54**	**1.41**	**0.18**	**0.68**		**Northern Triangle**	**0.57**	**0.62**	**1.12**	**0.89**	**0.80**	
Araxá	0.64	0.44	1.87	0.00	0.74	4	Ituiutaba	0.64	0.60	0.77	0.00	0.50	3
Frutal/Iturama	0.65	0.56	1.39	0.00	0.65	3	Patrocínio/ Monte Carmelo	0.85	1.01	1.80	1.77	1.36	2
Uberaba	0.56	0.57	1.20	0.33	0.67	5	Uberlândia/ Araguari	0.49	0.53	1.05	0.89	0.74	5
Minas Gerais	**0,79**	**0,94**	**1,41**	**0,42**	**0,89**								

Source: Authors, typology by Viana et al.[23].

The Northern Triangle and Southern Triangle macro-regions, despite having RS classified as Group 3, 4 or 5, are noteworthy for having iESF and iNASF well below the index of the other macro-regions and the state, denoting a regional weakness in this point of attention of RAPS. The state NASF index was 0.94 and is close to or greater than 1 in most other macro-regions. Regarding the CAPS index, MG had an overall iCAPS of 1.41 and all macro-regions had indices above 1.

Deepening the analysis for the RS, it is observed that the iRAPS of each macro-region can represent both regional homogeneity (as in the RS of the Southern Triangle), but also a varied range of regional heterogeneity (Figure 1). In the analysis of Table 2, there is also a variation of indicators within each RS. As an example, in the Southeast macro-region, the RS in Carangola has the highest iRAPS in the state (1.72) and the RS in Santos Dumont has one of the lowest iRAPS

(0.47). Santos Dumont's RS also draws attention because it is the only one in the state to have iN-ASF=0.

Interesting data can be seen in MG in the analysis of the SR grouped by the typology of Viana et al.[23]. The RSs in Group 1 have iRAPS statistically higher than the RSs from groups characterized by better socioeconomic conditions and health service provision. A negative statistical correlation was also observed between population density in RS and iRAPS values (Table 4).

We identified along the analysis of RAPS' attention points in the RS, that all RAPS have at least two Attention points, that is, APS (ESF or NASF), Specialized Psychosocial Care (CAPS regardless the modality), and 61% of them have three RAPS coverage points (APS, CAPS and LHG). Through statistical analyses, it was possible to see a significant relationship between iRAPS and RSs that have three or more RAPS attention points (Table 4).

Table 3. Kruskal & Wallis Test: indicators by health macroregions. Minas Gerais, 2019.

	Health Macroregions													
Indicators	Center	Southern Center	Jequiti-nhonha	East	Eastern South	Nor-the-ast	Nor-thwest	North	West	Sou-the-ast	South	Northern Triangle	Southern Triangle	p-value
iESF	0.74	0.82	0.99	0.83	0.94	1.00	0.83	0.98	0.81	0.77	0.77	0.57	0.60	0.00
iNASF	0.89	1.13	1.31	1.17	1.34	1.48	0.86	1.18	1.02	0.74	0.79	0.62	0.54	0.00
iCAPS	1.18	1.59	1.35	1.36	1.87	2.22	1.07	1.67	1.82	1.50	1.35	1.12	1.41	0.00
iLHG	0.23	0.64	1.09	0.39	0.60	0.70	0.00	0.55	0.02	0.98	0.36	0.89	0.18	0.00
iRAPS	0.76	1.04	1.19	0.94	1.19	1.35	0.69	1.09	0.92	1.00	0.82	0.80	0.68	0.00

Source: Authors.
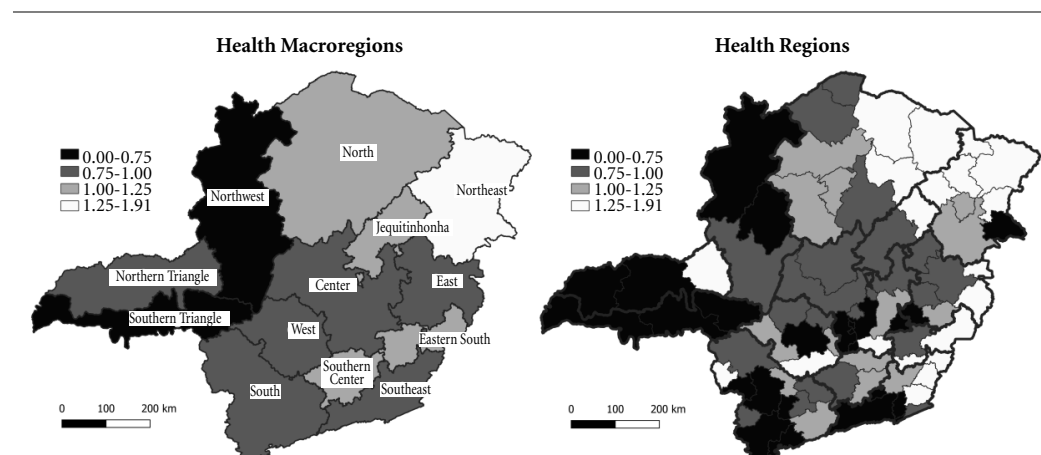
Figure 1. iRAPS Space Distribuition in Macro regions and Health Regions in Minas Gerais, 2019.

Source: Authors.

In the analysis of CAPS in its various modalities, it can be seen that the 68 RS that hold, in their territory, a population greater than 70 thousand inhabitants and would meet the deployment criteria for CAPS II, CAPSi and CAPS AD, 19 (27.9%) do not have CAPS II, 38 (55.9%) do not have CAPSi and 32 (47%) do not have CAPS AD. With respect to CAPSi, two macro-regions are not covered either. In this sense, the implementation of CAPS III and CAPS AD III is even more incipient: of the 48 RS with more than 150 thousand inhabitants, only 9 (18.7%) have CAPS III and 10 (20.8%) with CAPS AD III. Even when the macro-regions that meet the CAPS III implementation criteria are analyzed, seven macro-regions that do not have it are evidenced. The same occurs in relation to CAPS ADIII: 6 macro-regions do not have it, despite their population contingent, demonstrating an obstacle to the rearguard of the crises in vast state territories.

Discussion

The regionalization of health services has been at the center of the debate approaching the reorganization of the SUS in the last decade[20]; however, the development of this process still faces several obstacles. Politically, the municipal autonomy, as a result of the initial administrative direction of SUS decentralization, constitutes a challenge due to the logic of negotiating political interests at the expense of regional planning, combined with a weakness in the regulatory and financial induction of the federal government to increase its investments proportionally and equitably to the new needs for systemic strengthening of the RSs[4,6,20,30-32].

Regarding the regionalization of RAPS, this process can be even more complex, given that the structuring of an integrated public and universal mental health care network, with actions ranging from care for mild mental disorders to the management of crisis, in addition to services and actions for deinstitutionalization and psychosocial reintegration, presupposes the development of refined instruments of coordination, regulation and planning[16,33].

It is noticed that there was an extensive implementation of RAPS services in MG, mainly in small cities, indicating the spreading of the network into the hinterland regions, as found at the national level[16,17]. However, despite the advances, there is a need for greater investments to make the RS work as autonomous instances of the performance of RAPS in MG, considering that it would be expected a minimum standard of three RAPS coverage points in each RS[16], which does not occur in 39% of the RSs in the state.

As demonstrated internationally[34], a comprehensive mental health care network must have different levels of care functioning in an articulated way. In this way, the APS functioning as an organizer of the RAS, as proposed in the Brazilian model[5], plays a fundamental role in RAPS, aiming at the development of actions in a known territo-

Table 4. iRAPS Statistic Analysis according to Health Region Typology, RAPS Care Points in Health Regions and Populational Density of Macro regions and Health Regions. Minas Gerais, 2019.

		Average
iRAPS	Group 1	1.30
Viana *et al.*[23] Typology	Group 2	0.94
	Group 3	0.85
	Group 4	1.07
	Group 5	0.69
	Kruskal-Wallis Test (p-value)	0.000
iRAPS	<3 points	0.87
RAPS Care Points	>=3 points	1.07
	Kruskal-Wallis Test (p-value)	0.016
Health Regions	iRAPS	1.01
	Populational Density	38.65
	Spearman's rho test (p-value)	-0.24 (p-value 0.000)
Macroregions	iRAPS	0.95
	Populational Density	48.62
	Spearman's rho test (p-value)	-0.41 (p-value 0.000)

Source: Authors.

ry and enabling professionals to get to know users' life history and their communitarian bonds[35]. It is noticed that the implementation process of APS in MG was extensive, and most of the RS in the state have ESF coverage above 70%. However, there are still RS with low ESF coverage, such as Uberaba (56%) and Uberlândia/Araguari (49%), indicating the need for greater investment in APS in these regions from state policies. Furthermore, it is known that the isolated implementation of services and teams does not guarantee the proper functioning of health equipment. Several studies indicate that APS professionals have difficulties in dealing with psychosocial demands and resistance to care for users with mental health needs, which hinders the care process[35,36].

One of the strategies proposed by the MS to deal with this issue was the implementation of the NASF, which compulsorily holds a professional specialist in the mental health field, a fundamental issue especially for small cities, where quite often this specialist is the only professional with this training in the city[37]. In this sense, NASF professionals, using devices such as matrix support[36], aim to develop the proposal for Permanent Health Education[38] to share knowledge and increase the technical capacity of PHC professionals. However, despite the presence of the NASF in much of the state as an advance for mental health care in APS in MG, previous studies found practical difficulties in implementing this proposal, both nationally[36,39] and in the MG state[40], linked to perpetuation from the biomedical paradigm, to the lack of vision and management support, to the resistance of NASF professionals themselves to the matrix support proposal, to the chronic lack and high turnover of human resources, among others. These weaknesses can compromise both mental health care in APS and the integration of these services with the other components of RAPS. Additionally, the MS launched, recently[41], an ordinance that leaves it up to the municipal administration to select which professionals would be needed to compose the NASF team and removes the obligation to have a mental health professional, leading to a fear of continuation of the improvements already achieved.

Regarding the Street Clinics, which offer itinerant actions and care to populations with a high degree of social vulnerability and often neglected by the health services themselves[42], esteeming the value of singularities and opposing the asylum logic, it is noticed that 18 units in the state are insufficient to deal with the growing homeless population, especially in large urban centers, as also observed in the national context[43,44].

The increase of the number of Therapeutic Residential Services (SRT in Portuguese) in the state of MG was one of the objectives of the State Policy on Mental Health[45]. However, this expansion did not occur, as intended, in the period under analyses. At this point, it is also possible to infer obstacles related to the municipalization of the national health policy, as the SRTs are municipal management services, and their implementation is upon the manager's responsibility.

Regarding the specialized psychosocial care, the CAPS index shows that the state expanded its coverage from 0.95[8] in 2015 to 1.41 in 2019. This index was driven by small towns, as also found at the national level[16,17]. However, there was a low implementation of CAPS III and CAPSs aimed at specific populations in RS that would meet the population criteria for their implementation. Because CAPS III operates 24 hours a day, they can provide continuous care in the management of crises, being essential for RAPS to work without the need for a psychiatric hospital. Despite the complexity inherent to this service and its high maintenance cost[18], the results found suggest that investment in the implementation of these services should be seen as a priority by public policy for better functioning of RAPS in the state. These results may also suggest a difficulty in the regional agreement for more structured services that should provide support for the population contingent stipulated by MS regulations, even if divided into different cities. In this sense, the fact that iRAPS is inversely proportional to the population density of the regions under analysis, it may conceal practical difficulties in accessing the network, given the large territorial extension of some macro-regions and even RS in MG. Furthermore, it is known that health actions are hard to be performed in rural regions or regions with low demographic densities, due to factors such as logistical inefficiencies, lack of popular participation and the difficulty of allocating and hiring human resources[46]. On the other hand, the lower iRAPS values in the most populous regions may suggest an overload of services in these locations.

As an alternative to hospitalizations in psychiatric hospitals[47], Psychosocial Beds in General Hospitals (LHG) must be in charge of complex cases that are beyond the CAPS' capacity to provide solutions. However, it is identified that, out of a total of 767 LHG as agreed in the 2012 Action Plan[48], the state of MG managed to implement 375. Despite the deficiency, it is observed

that 53.3% of the LHG are located in small cities that do not count with CAPS III and that, if used properly, and in a shared way by the SRs, can favor comprehensive community care in these territories.

Regarding assistance to users with problems related to the use of alcohol or other drugs, there is a deficit in the implementation of CAPS AD and CAPS AD III in MG. These data are in agreement with the findings of Macedo *et al.*[49] who demonstrated that, in Brazil, considering the cities bearing criteria for implementation, 50.6% do not have CAPS AD and 79.1% do not have CAPS AD III. The same remark can be made for the Transitory Reception Units (UAT in Portuguese) which are services for people with needs arising from the use of alcohol or other drugs, with marked social and/or family vulnerability and with a permanence time of up to six months. Of the total 40 UAA (adult public) and 52 UAI (children and youth public) included in 2016[45], only 12.5% of the UAA and 13.5% of the UAI were implemented. This scenario is also consistent with the one found at the national level, in which, of the total number of cities that meet the implementation criteria, only 9.7% have this service[49]. Furthermore, prejudice, inexperience and little involvement of professionals from the APS and even from the NASF may still be seen towards people who use alcohol and other drugs[40,49]. These assertions may drive users and relatives to look for Therapeutic Communities (CT in Portuguese)[40], for services that, despite being included in the new national mental health policy, function contrary to the anti-asylum logic that grounded the implementation of RAPS in the country. Furthermore, many CTs do not work in accordance with current technical standards, leaving users subject to violations of their rights[11,50]. In MG, this fact is even more worrying, as the state government instituted, between 2012 and 2015, the *Aliança pela Vida* (Alliance for Life) program, which prioritized resources for these institutions, mostly private and religious in nature[45,50], and made it difficult the implementation of other services at the time. In addition, the presence of CTs, especially in small cities, can hinder municipal investment in the implementation of other RAPS services, as municipal managers may understand CT as the main support top users[40,49].

In psychosocial assistance to children and adolescents, it is noteworthy that the Ministry of Health reduced the population criterion for financing the CAPSi from 200,000 inhabitants. to 70,000 in 2011[7], which allowed the services to be expanded and driven towards the country hinterland. However, the implementation of these services in MG is still insufficient: 52.27% of the RSs lack coverage. This datum was also found in the national context, where, in a study on these devices, Macedo *et al.*[51] observed that they are insufficient and unevenly distributed, with the presence of many care gaps in the country, in all regions.

It is noteworthy in this study that the highest iRAPS values were found in RSs located in groups with low socioeconomic development and low service provision (Group 1), a fact that differs from that found by Macedo *et al.*[16] in the national territory, where the regions best equipped with mental health services had medium or high development and offer of health services. This result may suggest a prioritization of mental health in state policy actions.

It is considered that the created general indicator (iRAPS) is a useful tool for analyzing the structural aspect of RAPS in MG and can be reproduced in further studies, allowing comparisons over time of the implementation of the services of this network in the state or even in other Brazilian regions. It should be noted that Fernandes[17] also used a general index for critical analysis of RAPS services in Brazil. However, in this study, different choices were made regarding which services to include in the calculation. The inclusion of ESF coverage in the index presented here, not included in the calculation by Fernandes[17], is related to its fundamental role in the regionalization of RAPS services[6]. On the other hand, the non-inclusion of Transitory Reception Units was based on the fact that they are services directed to larger cities that represent a very small share of the cities in the state and could, therefore, bias the calculation of the index in MG. As in the calculation by Fernandes[17], the Mobile Emergency Care Services (SAMU 192 in Portuguese), Emergency Care Units (24-hour UPA) and others were not included in the calculation, as they are not specific services of RAPS. Solidarity enterprises, social cooperatives, Therapeutic Residential Services (SRT in Portuguese), Street Clinic Teams (eCR in Portuguese) and Living Centers were not included as they did not present general parameters defined for their development, making the calculation of their coverage unfeasible. Outpatient clinics and CAPS AD IV were not included, as they are part of a recent proposal and not yet consolidated[52].

Regarding limitations of this study, it is known that community mental health should fo-

cus not only on the treatment of users, but also on their potential, capabilities and aspirations[34,53]. Thus, the fact that the current research does not include, in the services analyzed, those that focus on user insertion and social participation, may be seen with reservations. It should also be considered that the use of indicators to analyze the implementation of RAPS services provides a panoramic view of the process. However, some caution is required when analyzing the results. As an example, it can be mentioned that the MS considers the existence of one CAPS for every 100,000 inhabitants to be adequate, and, thus, assume that, in the RS where the index is close to or greater than 1, we will have enough CAPS to serve the population, which is not always true. Even within a RS, there can be a territory with excess coverage that disguises a deficient one or even some cities that cannot benefit from the assistance due to the lack of an agreement to share services or, even when this agreement exists, the great distance between some cities and/or the lack of public transport can yield assistance gaps[54]. Thus, for a better understanding of the functioning of RAPS in the state of MG, further research is needed that can deepen the results found here.

Final considerations

The analysis of the regionalization of health in the SUS makes it possible to identify particularities of psychosocial care in certain territories, linked to historical, economic and social factors that produce differences in health conditions, service provision, coverage, human resources and funding. In this sense, this study analyzed the regionalization of RAPS services in MG through the construction of indicators that reflect structural aspects of this network, providing evidence that can also be used by managing actors to improve mental health care in the state. From the scenario presented, it is clear that the implementation of a robust network of RAPS services in MG, however, despite the advances already achieved, for the consolidation of RS as an autonomous unit of psychosocial care, still needs improvements. The knowledge produced also yielded subsidies for an assessment of the degree of implementation of RAPS in the state, a study the authors will develop later on.

Collaborations

VAA Coelho participated in the conception, design, collection, analysis and interpretation of data and in the writing of the article. LI Andrade participated in the collection, analysis and interpretation of data and in the writing of the article. DA Guimarães participated in the conception, design, analysis and interpretation of the data and in the writing of the article. CM Modena participated in the conception, design and interpretation of data and critical review of the text. EAA Guimarães participated in the conception, design, interpretation of data and writing of the article. CAP Gama participated in the conception, design, collection, analysis and interpretation of data and in the writing of the article. LSM Pereira participated in the design, collection, analysis and interpretation of data and critical review of the text.

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