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Analysis of professional training in Multiprofessional Health Residency Programs in Brazil from the perspective of residents

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Abstract *The aim of this study was to analyze professional training in multiprofessional health residency programs (MHRPs) in primary care from the perspective of residents from 20 programs who had completed residency in the period 2015-2019. We undertook a cross-sectional study analyzing criteria in the dimensions Pedagogical Approach and In-Service Education Settings responded using a 10-point Likert scale. The study sample consisted of 365 graduates from MHRPs in 12 Brazilian states. The highest-scoring criteria in the dimension Pedagogical Approach (Cronbach's α=0.94) were broad concept of care and professional training oriented towards comprehensive care (P50=10). The lowest scoring criteria were those involving preceptorship (P50=7). With regard to the In-Service Education Settings dimension (Cronbach's α=0.90), the main strength was group educational activities (P50=9) and the main weaknesses were adequacy of the physical structure of health facilities (P50=6), participation of residents in local health committees (P50=6), and coordination with medical residency programs (P50=5). The findings show that professional training in MHRPs is aligned with the principles and guidelines underpinning Brazil's public health system, with emphasis on comprehensiveness and prevention. However, efforts are needed to improve preceptor training and address weaknesses in practice settings.*

Key words *Postgraduate Education, Nonmedical Internship, Primary Health Care, Human resource training*

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Introduction

Health residency programs (HRPs) are distributed throughout the country, providing specialist training for health professionals in both uniprofessional and multiprofessional modalities[1]. In essence, these programs constitute in-service education aimed at providing high quality training to professionals working in the country's public health system, the *Sistema Único de Saúde* (SUS) or Unified Health System, through work processes developed in local and regional settings, focusing on priority areas[2]. The subject-based training logic is replaced by the promotion of real-life training settings linked to the social context, where learning is based on experiences in the health facility and local community[3].

From an operational point of view, the typical minimum HRP course load is 5,760 hours spread out over at least two years, 80% of which is practical or theory-practice and 20% theory[4]. The multiprofessional modality is unique in that students from various professions learn together as a team in a specific core area, each focusing on the skills and competencies relevant to their profession[5].

HRP core areas may be developed across the three levels of complexity in the SUS, following the priority areas established by the technical chambers of the National Commission on Multiprofessional Health Residency: 1 - Diagnostic and Therapeutic Support, Clinical and Surgical Specialties; 2 - Intensive, Urgent and Emergency Care; 3 - Primary Care, Family and Community Health, Public Health; 4 - Mental Health; 5 - Functional Health; and 6 - Animal and Environmental Health[6]. However, there is consensus on the need to support professional training in primary care, especially the Family Health Strategy[7,8].

A systematic review of the literature on training in multiprofessional health residency programs (MHRPs) in primary care and/or family health in Brazil showed that articles focused on the specific characteristics of individual programs[9], revealing the need to extend the analysis beyond the boundaries of single programs. This need is corroborated by the lack of in-situ evaluations of current programs[10].

In light of the above, the aim of the present study was to analyze training in MHRPs in primary care in Brazil, focusing on pedagogical approaches and in-service education settings based on the views of students who completed residency in the period 2015-2019.

Method

We conducted a quantitative cross-sectional study with students who completed MHRPs in primary care and/or family health between 2015-2019. We included programs run by public higher education institutions, public health schools, and government schools, resulting in 37 eligible programs after screening. A total of 21 MHRPs representing all of Brazil's major regions agreed to participate, providing a list of 1,159 students who completed residency during the study period.

The residents were invited to participate in the study by email with an attached questionnaire created using Google forms structured into three dimensions within a criteria matrix: 1 - Personal Motivation; 2 - Pedagogical Approach; and 3 - In-Service Education Settings. Each dimension was divided into subdimensions answered on a 10-point Likert scale[11] ranging from 1 (strongly disagree) to 10 (strongly agree). The criteria matrix was previously validated using the Delphi technique. The data were collected between June and September 2020. The methodology has been described in a previous study[12].

A total of 365 residents responded the questionnaire, resulting in a response rate of (31.5%), which is above the expected rate for email surveys (25%)[13]. Based on the "n" obtained, the sample size necessary for estimating a population proportion of a small finite population, 95% confidence interval, 5% sampling error, and 50% sample proportion, the number of respondents is deemed to be representative[14].

The following variables were used to characterize the MHRPs: program setting (practice setting), year of completion of the residency program, and type of end-of-residency project. An exploratory analysis of training in the MHRPs was performed using the criteria proposed in the Pedagogical Approach and In-Service Education Settings dimensions. The Pedagogical Approach dimension consists of the following subdimensions totaling 18 criteria: Pedagogical Methodologies; Pedagogical Plan; Conditions Necessary for the Higher Education Institution to Offer the Residency Program; and Actors Responsible for the Teaching-Learning-Work Process. The In-Service Education Settings dimension is made up of the following subdimensions totaling 13 criteria: Health Care Facility Infrastructure; Residency Activities with Patients, Services and Practice Settings; Coordination of Multiprofessional Residency Activities with other Course Activities.

The criteria were classified as ordinal qualitative variables. The relevant literature suggests that this type of variable should be treated as an interval variable only if the data follow a normal distribution[11]. The results of Kolmogorov-Smirnov test showed that the data were not normally distributed and therefore the ordinal data were analyzed using positioning measurements. The internal consistency of the criteria for each dimension was determined using Cronbach's alpha, which ranges from 0 to 1, where 1 indicates maximum internal consistency[15]. The data were analyzed using Microsoft Excel and IBM SPSS.

The study protocol was approved by the Onofre Lopes University Hospital's research ethics committee: codes 3.744.514 and 3.829.247 (amendment 1) and 3.898.156 (amendment 2). The protocol was also approved by the participating institutions' ethics committees. All participants signed an online informed consent form. Participants were only able to access the questionnaire after signing the form on the understanding that they could withdraw freely at any stage of the study.

Results

A total of 365 outgoing residents from 20 MHRPs in 12 states participated in the study. Table 1 shows that the proportion of responses received and number of respondents from each program are similar. The year of completion of the residency program was similar across the programs, with 50% of respondents completing the residency in the last two years of the study period (Table 1).

Thirty per cent of the 20 programs (6) developed activities in state capitals, 65% (13) in smaller towns and cities, and 5% (1) in both settings.

The main type of end-of-residency project undertaken by the residents was scientific article (66.8%), followed by thesis (27.5%) and other (5.7%).

The highest-scoring subdimensions of the Pedagogical Approach dimension were Methodologies and Pedagogical Project, whose criteria obtained median scores of 9 or 10. The highest-scoring criteria were concept of care and training oriented towards comprehensive care, with at least 50% of respondents selecting the option "strongly agree". With regard to the actors involved in the training process, at least 25% of respondents selected 5 or under on the agree-disagree scale for the items referring to preceptors (Table 2).

Weaknesses were revealed in the dimension In-Service Education Settings, especially in relation to coordination with medical residency programs (P50=5) and other HRPs (P50=6), enough physical space in health facilities (P50=6), and patient integration in health councils (P50=6). Patient integration through group educational activities (P50=9) and satisfaction with training in practice settings (P50=8) were rated positively (Table 3).

The internal consistency of the criteria proposed in each dimension was very satisfactory (Cronbach's alpha 0.94 for Pedagogical Approach and 0.90 for In-Service Education Settings) (Tables 2 and 3).

Discussion

Training in MHRPs is an innovative teaching and learning strategy[2], presenting an alternative to traditional health professional training, which has historically adopted a uniprofessional approach, leading to the fragmentation of professional relationships and signaling the need to review the model[16]. Considering current health work challenges posed by changes in epidemiological and demographic profiles, the resurgence of eradicated diseases, and the effects of social inequality on patterns of morbidity and mortality[16], the present study provides important insights into training in MHRPs in primary care.

Before addressing the findings, it is important to highlight the capillarity of the programs analyzed by this study, with more than half developing their practical activities in small towns and cities outside state capitals. This is an important finding given the well-known difficulty services experience in attracting and retaining health professionals in remote rural areas[17]. This is probably one of the impacts of the Support Program for Federal University Restructuring and Expansion Plans, which has increased the provision of courses by public universities in areas isolated from large urban centers, resulting in the consolidation of campuses and creation of postgraduate and residency programs[18]. Given the potential MHRPs have for promoting the retention of professionals in underserved regions[19], the distribution of programs identified in this study may contribute to a reduction in inequalities in the provision of professional training.

The end-of-residency project is a mandatory requirement for certification in a specialty[20]. Although the present study showed that the main

Table 1. Distribution of responses received and respondents by Institution offering the Multiprofessional Health Residency Program and year of completion.

	Location	Responses received		Respondents	
		n	%	n	%
Institution					
UFAC	Rio Branco	18	1.6	7	1.9
UEPA	Belém	56	4.8	14	3.8
UEMA	Caxias	9	0.8	8	2.2
PHS/CE	Fortaleza and smaller towns and cities in Ceará	358	30.9	82	22.5
Visconde de Sabóia PHS	Sobral	125	10.8	38	10.4
UFRN	Caicó and Currais Novos	70	6.0	41	11.2
UERN	Mossoró	56	4.8	28	7.7
UFPE	Recife	37	3.2	16	4.4
UPE*	Caruaru and Garanhuns	26	2.2	9	2.5
UPE**	Recife	43	3.7	13	3.6
UNEB	Salvador	34	2.9	12	3.3
FESFSUS/FIOCRUZ	Camaçari, Dias D'Avila and Lauro de Freitas	79	6.8	16	4.4
UNIMONTES	Montes Claros	42	3.6	12	3.3
UFJF	Juiz de Fora	40	3.5	15	4.1
UFRJ	Rio de Janeiro	54	4.7	10	2.7
UFMT	Rondonópolis	29	2.5	11	3.0
ESCS	Brasília	3	0.3	0	0.0
UEL	Londrina	26	2.2	12	3.3
UNICENTRO	Guarapuava	13	1.1	6	1.6
UNILA	Foz do Iguaçu	22	1.9	3	0.8
FURG	Rio Grande	19	1.7	12	3.3
Total		1,159	100.0	365	100.0
Year					
2015		161	13.9	31	8.5
2016		169	14.6	47	12.9
2017		249	21.5	76	20.8
2018		244	21.0	107	29.3
2019		336	29.0	104	28.5
Total		1,159	100.0	365	100.0

Note: UFAC - Universidade Federal do Acre; UEPA - Universidade do Estado do Pará; UEMA - Universidade do Estado do Maranhão; PHS - Public Health School; UFRN - Universidade Federal do Rio Grande do Norte; UERN - Universidade do Estado do Rio Grande do Norte; UFPE - Universidade Federal do Pernambuco; UPE - Universidade de Pernambuco; UNEB - Universidade do Estado da Bahia; FESF-SUS/FIOCRUZ - Fundação Estatal Saúde da Família/Fundação Oswaldo Cruz; UNIMONTES - Universidade Estadual de Montes Claros; UFJF - Universidade Federal de Juiz de Fora; UFRJ - Universidade Federal do Rio de Janeiro; UFMT - Universidade Federal do Mato Grosso; ESCS - Escola Superior de Ciências da Saúde; UEL - Universidade Estadual de Londrina; UNICENTRO - Universidade Estadual do Centro-Oeste; UNILA - Universidade Estadual da União Latino Americana; FURG - Universidade Federal do Rio Grande. *Multiprofessional residency in family health with emphasis on rural populations; **Multiprofessional residency integrated with family health.

Source: Authors.

type of end-of-residency project undertaken by the residents was the production of a scientific article, a review of the literature on MHRPs showed that few studies published by residents address their experiences during residency programs[21]. On the other hand, Vale *et al.*[20] draw attention to the wide range of different types end-of-residency projects, including science, technological and audio/visual-based products, depending on the specific rules and regulations of each program. The dissemination of experiences gained in end-of-residency projects is important. However, given the ever-increasing demands of scientific journals, it is likely that residents will face difficulty publishing, especially with works that take a more alternative approach.

Table 2. Evaluation of the dimension "Pedagogical Approach" of multiprofessional residency programs in primary care by students completing residency in the period 2015-2019. Brazil, 2020 (n=365).

Pedagogical Approach - Cronbach's alpha=0.94				
Subdimension	**Criteria**	**P25**	**P50**	**P75**
Pedagogical Methodologies	Promotion of interprofessional education and working	8	9	10
	Training based on active learning methodologies	8	9	10
	Residents play an active role in the teaching-learning-work process	8	9	10
	Formative assessment system aimed at making residents more reflective	7	9	10
Pedagogical Plan	Educational process tailored to working in the SUS	8	9	10
	Concept of care transcends biological aspects, considering social determinant of health	9	10	10
	Training oriented towards comprehensive care	9	10	10
	Link between theory and practice	8	9	10
Conditions necessary for the higher education institution to offer the residency program	Availability and access to library with titles relevant to residency activities	6	8	9
	Adequate physical structure and facilities for teaching activities	6	8	9
	Access to database	6	8	9
Actors Responsible for the Teaching-Learning-Work Process	Preceptors qualified for in-service teaching	5	7	9
	Preceptors directly responsible for supervising activities are present and accessible	5	7	9
	Tutors responsible for the academic guidance of preceptors and residents are presents and participative	6	8	9
	Supervisors of end-of-residency project available for supervision	7	9	10
	Preceptors conduct activities to ensure meaningful learning	5	7	9
	Tutors conduct activities to ensure meaningful learning	6	8	9
	Teachers conduct activities to ensure meaningful learning	7	8	9

Source: Authors.

The criteria of the subdimensions Pedagogical Methodologies and Pedagogical Plan (Pedagogical Approach dimension) were highly rated by residents. The positive evaluation of the Pedagogical Methodologies criteria reveals an important dialogue between MHRPs and permanent health education, which consists of an ongoing process of on-the-job learning, promoting reflection and changes in practices[22]. In addition, interprofessional education contributes to the training of professionals who are better prepared for collaborative practice and effective team work[23]. From this perspective, interprofessional education to essential to strengthening the pivotal role Family Health Strategy plays in organizing primary care in Brazil, insofar as it incorporates various professions working together as a team[22].

The scores for the Pedagogical Plan criteria reveal that the programs are aligned with the underlying principles and guidelines of the SUS and care practices recommended in the National Primary Care Policy (PNAB)[24]. This is corroborated by a study investigating training for psychologists in a MHRP in primary care. The findings show that the course's pedagogical plan offers residents the opportunity to understand and enhance training committed to defending the SUS[25]. The respondents of the present study also confirmed that the programs showed coherence between theory and practice, which is reinforced by the findings of a reflexive study undertaken by Bernardo *et al.*[2].

The three criteria of the subdimension Conditions Necessary for the Higher Education Institution to Offer the Residency Program received the same score, raising a number of questions. Given that 80% of the residency is in-service training[4], it is possible that the services are distant from the

Table 3. Evaluation of the dimension "In-Service Education Settings" of multiprofessional residency programs in primary care by students completing residency in the period 2015-2019. Brazil, 2020 (n=365).

In-Service Education Settings - Cronbach's alpha=0.90				
Subdimension	**Criteria**	**P25**	**P50**	**P75**
Health Care Facility Infrastructure	Well maintained	6	8	9
	Adequate ambience	5	7	8
	Equipment works properly and well-maintained	5	7	8
	Proper equipment available for specific primary care activities	5	7	8
	Enough physical space for care and educational activities	4	6	8
Residency Activities with Patients, Services and Practice Settings	Referral services based on the health care networks logic	6	8	9
	Intersectoral services to support health care delivery	6	7	8
	Patient integration through group educational activities	8	9	10
	Patient integration through participation in local health committees	4	6	8
	Satisfied with the training received in the practice settings	7	8	9
Coordination of Multiprofessional Residency Activities with other Course Activities	Health undergraduate course activities in practice settings	6	7	8
	Other multiprofessional or uniprofessional health residency program activities	4	6	8
	Medical residency program activities	1	5	7

Source: Authors.

higher education institutions offering the programs, resulting in difficulty accessing the institution's physical infrastructure and support materials and equipment during the residency. One of the limitations of the present study is that it did not include programs proposed by local government health departments and private education institutions. However, given its pioneering nature, this study makes an important contribution to existing knowledge about training in MHRPs, outweighing this limitation.

With regard to the actors involved in the teaching-learning-work process, the findings indicate possible weaknesses in the performance of preceptors and tutors in comparison to teachers. According to Ribeiro *et al.*[26], preceptors are professionals who provide on-the-job-training, playing the role of educator, and should therefore have the necessary knowledge and skills to fulfil this role. However, a literature review of training in MHRPs in primary care and/or family health identified weaknesses in preceptorship and tutoring[9]. Santos Filho *et al.*[27] highlighted a possible reason for this situation, showing that preceptors and tutors often only receive training during the preceptorship. In addition, studies indicate that, as professionals working in the health facility, preceptors and tutors do not have time set aside in their work schedule for planning teaching activities[21,28,29]. This was one of the issues raised by residents and teachers in the IX National Meeting of Health Residencies[30].

It is therefore essential that higher education institutions provide training for the professionals working in the facilities in preceptorship[31]. An important initiative in this area is the Specialist Training Course in Health Preceptorship offered by Rio Grande do Norte Federal University's Laboratory of Technological Innovation in Health via the SUS's online learning platform AVASUS, which has trained more than 2,000 preceptors from across the country[32].

The scores for the In-Service Education Settings criteria reveal important weaknesses in the physical structure of health facilities, involving residents more actively in public participation, and integration with other residency programs.

According to the PNAB, all basic health units are considered potential professional training and in-service teaching settings and spaces for research and innovation for the SUS[24]. However, it is possible that the planning of the physical structure of these units fails to take into account in-service teaching activities, meaning that these settings are often inadequate for the combined activities of professionals, undergraduate students, and residents. In addition, it is important to highlight that MHRPs in primary care often include professions that are not part of the Family Health Strategy team, requiring the provision

of the necessary apparatus for the development of professional activities in Primary Care.

The high rating obtained by the criteria patient integration through group educational activities (subdimension Residency Activities with Patients, Services and Practice Settings) reinforces the concept of comprehensive care highlighted above, suggesting the active involvement of residents in preventive activities. With regard to the integration of MHRP activities with other services, Silva and Dalbello-Araújo[21] highlight that the movement of residents through the different institutions that make up the health care network is an important contribution of these programs. This experience is particularly significant because it helps residents understand patient flows, contributing to the effective delivery of comprehensive resolutive care. With regard to engagement in spaces of public participation, although residents understand that greater attention should be paid to public participation in residency training, the findings reveal the need to consider the time spent traveling to and from these spaces to develop activities[30].

The subdimension Coordination of Multiprofessional Residency Activities with other Course Activities highlighted weaknesses in coordination with medical residency programs. This finding is supported by what the literature calls "professional silos" or "professional tribalism", referring to the tendency to emphasize the development of specific competencies separately from other professions[23]. While MHRPs envisage integration with medical residency programs[5], this was the lowest-scoring criteria in the present study, showing that integration is far from sufficient. However, the literature highlights some initiatives in this area[33,34], demonstrating that, albeit challenging, integration is possible.

Finally, it is important to highlight that, despite in-service training challenges, the respondents showed satisfaction with the training received in the practice settings. This leads us to believe that the experiences and lessons learned outweigh the problems.

A second study limitation is the sampling method. Given the limited and dispersed study population, we opted to invite all eligible outgoing residents and interview those who agreed to participate. However, the proportion of the respondents across the programs is very similar to the overall proportions among outgoing residents, showing that the method did not compromise study findings or result in bias.

Conclusion

Our findings show that training in MHRPs in primary care is aligned with current health demands, focusing on comprehensiveness and prevention, despite the fact that practice settings do not possess the ideal conditions for training, both in terms of structure and staffing. Despite weaknesses, the satisfaction of outgoing residents with training demonstrates that meaningful learning outweighs the obstacles.

Intrinsically linked to the SUS, the guiding thread of MHRPs is commitment to addressing social realities and the ongoing development of an interprofessional approach, underpinned by a critical and reflexive pedagogical model and working together in a team. Although these principles are clearly set out in undergraduate curriculum guidelines, they remain weakly implemented in practice in the majority of programs. It is also worth emphasizing that the development of MHRPs in primary care in higher education institutions outside state capitals has contributed to the permanent education of professionals working in underserved regions and the strengthening of care delivery.

Core problems include the role played by preceptors, with findings signaling the need to focus more attention on training throughout the course of the degree, and poor operating conditions in health facilities, which may be aggravated by the current dismantling of the SUS. It is also important to highlight the challenge of involving residents, tutors, and preceptors more actively in public participation by building the capacity of and/or participating in local health committees.

Possible pathways to addressing these weaknesses include the adoption of measures focusing on the qualification and integration of actors involved in the teaching-learning-work process, studying ways of promoting coordination between MHRPs and other residency programs, and planning to address the problems experienced in practice settings within current governance structures.

Collaborations

TBM Flor contributed to study conception and design, data analysis and interpretation, drafting the article, and approving the final version to be published. NM Miranda contributed to data analysis and interpretation, revising the article, and approving the final version to be published. PH Sette-de-Souza contributed to study conception and design, critically revising the article, and approving the final version to be published. LRA Noro contributed to study conception and design, drafting and critically revising the article, and approving the final version to be published.

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