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SPECIAL ARTICLE

Implementation of a residency program in anesthesiology in the Northeast of Brazil: impact on work processes and professional motivation

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Abstract
Background and objectives: To understand, through the theory of social representations, the influence exerted by the establishment of a residency program in anesthesiology on anesthetic care and professional motivation in a tertiary teaching hospital in the Northeast of Brazil.
Method: Qualitative methodology. The theoretical framework comprised the phenomenology and the social representation theory. Five multidisciplinary focus groups were formed with 17 health professionals (five surgeons, five anesthesiologists, two nurses, and five nursing technicians), who work in operating rooms and post-anesthesia care units, all with a prior and a posteriori experience to the establishment of residency.
Results: From the response content analysis, the following empirical categories emerged: motivation to upgrade, recycling of anesthesiologists and improving anesthetic practice, resident as an interdisciplinary link in perioperative care, improvements in the quality of perioperative care, and recognition of weaknesses in the perioperative process. It was evident from upper gastrointestinal bleeding secondary to prolonged intubation that the creation of a residency in anesthesiology brings advancements that are reflected in the motivation of anesthesiologists; the resident worked as an interdisciplinary link between the multidisciplinary team; there was recognition of weaknesses in the system, which were identified and actions to overcome it were proposed.

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Conclusion: The implementation of a residency program in anesthesiology at a tertiary education hospital in the Northeast of Brazil promoted scientific updates, improved the quality of care and processes of interdisciplinary care, recognized the weaknesses of the service, developed action plans and suggested that this type of initiative may be useful in remote areas of developing countries.
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PALAVRAS-CHAVE
Residência médica;
Tutoria;
Anestesiologia;
Assistência perioperatória

Implantação de residência em anestesiologia no interior do Nordeste do Brasil: impacto nos processos de trabalho e na motivação profissional

Resumo
Justificativa e objetivos: Compreender, pela teoria das representações sociais, a influência exercida pela implantação de um programa de residência em anestesiologia nos cuidados anestésicos e na motivação profissional em um hospital de ensino terciário do interior do Nordeste do Brasil.
Método: Metodologia qualitativa. A fenomenologia e a teoria da representação social foram o referencial teórico. Formaram-se cinco grupos focais multidisciplinares, com 17 profissionais de saúde (cinco cirurgiões, cinco anestesiologistas, duas enfermeiras e cinco técnicos de enfermagem) que atuam no Centro Cirúrgico e na Sala de Recuperação Pós-Anestésica, todos com experiência anterior e posterior à implantação da referida residência.
Resultados: Da análise de conteúdo das falas, emergiram as seguintes categorias empíricas: motivação para atualização, reciclagem dos profissionais anestesiologistas e melhoria das práticas anestésicas; o residente como um elo interdisciplinar nos cuidados perioperatórios; melhorias na qualidade da assistência perioperatória; reconhecimento de fragilidades no processo perioperatório. Evidenciou-se que a criação de uma residência em anestesiologia traz avanços, que se refletem na motivação dos anestesiologistas; o residente funcionou como um elo interdisciplinar entre a equipe multiprofissional; houve reconhecimento de fragilidades do sistema, identificaram-se as deficiências e apontaram-se ações para superação.
Conclusão: A implantação de um programa de residência em anestesiologia em um hospital de ensino terciário do interior do Nordeste do Brasil promoveu atualizações científicas, melhorou a qualidade da assistência e os processos de cuidados interdisciplinares, reconheceu as fragilidades do serviço, desenvolveu planos de ação e sugeriu que esse tipo de iniciativa pode ser útil em áreas remotas de países em desenvolvimento.
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Introduction

Residency is a training program for long-term service, recognized as the best mechanism for training physicians for specialized, responsible, and quality professional practice. Given the need to expand the residency to meet the demands of specialists in strategic areas and regions for the *Sistema Único de Saúde* – SUS (Unified Health System), the Ministries of Health and Education have developed a joint effort to fund new programs to promote this expansion in an orderly manner, in line with the resolutions of the *Comissão Nacional de Residência Médica* – CNRM (National Medical Residency Committee).[1] Studies conducted in 2005, and repeated in 2006 and 2008, reported a high concentration of programs and institutions offering residency in the Southeast and South regions, respectively. The concentration of vacancies and scholarships for residency in the Southeast region coincides with the concentration of other health indicators. National studies have shown the overlap percentage of practicing physicians over the number of vacancies and scholarships residency according to the region in Brazil.[2] The supply of new residency centers with quality programs helps to keep doctors in the regions where they attended the residency. A study published in the New England Journal of Medicine,[3] in 2010, confirms some of the data collected between 2004 and 2008 in Brazil.[2] Similarly, studies conducted in Canada confirm medical residency as a factor for keeping physicians even in areas more distant from that country.[4]

The specialized medical training, present in Brazil for over 30 years, had never been the subject of specific public policies. *The Programa Nacional de Apoio à Formação de Médicos Especialistas – Pró-Residência* (National Support Program for Specialized Medical Training – Pro-Residency),

launched in October 2009, constitutes a milestone in the establishment of a public policy to foster specialized medical training, from the health needs of the country, and provides accreditation of new programs under matrix support.[2]

Matrix support is a complementary arrangement built from the establishment of a specialized rearguard of support to matrix institutions. It has the purpose of co-responsibility, with technical and pedagogical function, with technology transfer for team qualification.[4]

A study of the distribution of specialists on the national scene indicated the anesthesiology specialty as a priority in the Northeast. In 2010, the first Medical Residency Program (MRP) in Anesthesiology began in the Northeast of Brazil under matrix support, accredited by the Ministry of Education and the Brazilian Society of Anesthesiology.

The aim of this study was to evaluate the influence of an Anesthesiology Residency Program implementation at a tertiary teaching hospital in the Northeast of Brazil on the processes and anesthetic care, through the perception of health professionals who have worked in this sector and experienced this transition period.

Method

This study used a theoretical and methodological approach given by qualitative-phenomenological research[5-7] on perceptions of health professionals working in the operating room and post-anesthesia care unit of *Santa Casa de Misericordia de Sobral* (Teaching Hospital of the Universidade Federal do Ceará – Campus Sobral), and whether anesthesiologists, surgeons, nurses, and nursing assistants regarded the change and evolution of processes occurring in the following sectors: operating room (OR), post-anesthesia care unit (PACU), and anesthesiology service, from the establishment of the anesthesiology residency. The social representation theory[8,9] allowed the understanding of the transformation phenomenon that a medical residency implantation can exercise in a service or sector.

Selection process and sample

Seventeen health professionals were interviewed (five surgeons, five anesthesiologists, two nurses, and five nursing technicians) during their working hours. The interviews took place in a private room next to the operating room. The sample was selected by convenience and the ''saturation point'' was considered, which is set when the interviewer realizes that there is no new information to be heard. Participants were health professionals working in the OR and PACU, all with both anterior and posterior experience to the establishment of the anesthesiology residency and who willingly accepted the invitation to participate in the study. Professionals who had no experience previous to the establishment of residency were excluded.

Selected professionals were allocated into multidisciplinary focus groups. Professional categories included anesthesiologists, surgeons (traumatologists, obstetricians, general surgeons, and neurosurgeons) and nursing staff (nurses and nurse technicians). Each focus group consisted of four to six participants, with at least one member of each category. The entire speech was free, without interruption made by the observer, volunteers spoke randomly, there was dialog between them, but with the participation of all. The responses were recorded and transcribed for analysis and subsequently classified into categories by frequency count.[9]

The research adopted measures to preserve the confidentiality, anonymity, and privacy of respondents. Their full names were restricted to informed consent signed by all. The methodological procedures were explained to the respondents individually, including the possibility to interrupt, answer the questions or not, and the right to refuse to participate.

The project was reviewed and approved by the Ethics Committee of the Hospital.

Research instrument

The data collection instrument used was a semi-structured interview with five guiding questions after beginning the residency in anesthesiology: (1) Was there a change in surgical center routine? (2) Was there any improvement in the quality of anesthesia care? (3) Was there an incorporation of new anesthetic techniques? (4) Was there changes in interdisciplinary relationships? (5) What could be improved in the implanted residency?

Data analysis

After due transcription, the data and information collected in the speech of health professionals in the focus groups were analyzed for their content based on social representation theory. We sought to explore the structures that respondents expressed as relevant. Nonverbal elements expressed by respondents were taken into account at the time of collection and analysis of data.[5]

Results

The categories listed below emerged from the analysis of the focus groups:

Upgrade motivation, recycling of anesthesiologists, and improvement in anesthetic practice

It was emphasized that the institution's anesthesiologists were motivated by the presence of the medical resident, which revived interest in updating and the need to engage in processes of continuing education. There was satisfaction with the creation of protected time for didactic and scientific development, such as seminars and lectures with different guests. This was evidenced by the following statements:

> *In terms of learning, it was a great encouragement to study, fly higher flights when caring more severe patients, with the exchange of experiences with residents.* (Anesthesiologist)

This stimulus aimed at updating and training was not restricted only to the hospital, anesthesiologists were motivated to participate in conferences and scientific meetings,

encouraged by the constant presence of residents in these events.

Much has changed in terms of education. The professors themselves started to study more, be more careful with the anesthetic routines. They attended more conferences and brought innovations, renew the service. There was a substantial change, the anesthesiology service improved and increased by 60% to 80% after the Anesthesiology Residency implementation. (Surgeon)

The acquisition and improvement of equipment, as well as the surgical center structure, were topics of much discussion among focus groups and recurrent opinion in speech:

New appliances were purchased; there was a full recycling of professional anesthetists, scrapped material was replaced. (Surgeon)

With the arrival of residents to the institution, the use of a variability of anesthetic techniques increased, which were known by the professionals, but were underused due to the immense surgical demand that overloaded them, resulting in some degree of weakness in the quality of care offered.

We already knew the anesthetic procedures, such as placement of epidural catheters in major surgeries, but residents started to motivate us to perform this procedure; because, to shorten the anesthetic procedure, our initiative was always the administration of general anesthesia we did not have a closer look at postoperative pain. There was a significant increase in quality of care with the introduction of epidural catheters [...] Another important type of monitoring for the service was the BIS. We began to use this equipment with the implementation of the Residency Program. We knew of its existence through literature, but with the residents arrival it was put into operation. (Anesthesiologist)

Similar to surgeons and anesthesiologists, nursing staff also recognized the evolution and improvement involving anesthetic techniques and also highlighted the benefits to patients from the use of epidural catheters in high complexity surgeries, with positive effects on postoperative acute pain management.

The use of epidural catheter in major surgery is a plus, a big improvement for patients postoperatively, this is very good. (Nurse)

The resident as an interdisciplinary link in perioperative care

In this category, the improvement of dialog between surgeon and anesthesiologist about the planning and choice of anesthetic technique based on the proposed surgical procedure was observed repeatedly.

There was more interaction between the professor anesthetist and surgeon about the surgical procedure. The possibility of a particular anesthetic technique for a given procedure was suggested. I've felt it; there is questioning with the residents. (Surgeon)

This statement suggests that by bringing questions, the presence of residents encourages dialog and contributes to a shared decision-making between the preceptor of anesthesiology and the surgeon, with the effective participation of residents.

Improvement in interdisciplinary relation and communication processes extended to the nursing staff.

The residents here with us became a link between nurses, surgeons, and anesthetists. (Nursing)

Minimizing conflicts in the surgical environment was also mentioned:

There used to be more conflict in the operating rooms. With residents, it disappeared, involving the educational part. (Anesthesiologist)

Improvements in the quality of perioperative care

The improved quality of care for patients after the Anesthesiology Residency Program implantation was frequently mentioned, with induction of reflective practice by teachers, motivated not only by constant inquiries and questions from residents but also through a more comprehensive and integrated approach to patients, rather than a purely technical and intraoperative approach. These issues can be seen in the following statements:

Preanesthetic visit is made by residents [...] this is a plus for anesthesia service qualification. (Surgeon)

This statement addresses an important aspect of quality of care, as the preanesthetic evaluation, with knowledge of the clinical condition of the patient before the procedure, is mandatory under the resolution of CFM N° 1802/2006, especially to assess risks, outline an appropriate anesthetic plan, and make the procedure safer.

The presence of the anesthesiology resident at the service facilitated the achievement of perioperative care, and preanesthetic evaluation was a highlight, with subsequent discussion of cases with professors, as they were few in number compared to the large surgical demand, and had no time available to provide adequate preoperative care to patients eligible for elective surgeries.

Our team is small and there are over a thousand surgeries per month [...], we end up rushing and simplifying the processes. Major surgery indicated for epidural catheter end up not being made due to lack of time. Residents have made this procedure feasible with us. (Anesthesiologist)

Preanesthetic visit is made by the residents and this is a gain in qualifying the anesthesia service. (Surgeon)

Prior assessment of cases, with discussion with professors, and the creation of an anesthetic plan that improves intraoperative monitoring provided a favorable environment for care systematization, increases the safety of anesthesia, and improved quality of care. These considerations are clearly evident in the speeches:

Regarding monitoring, care, and the whole procedure, the patient was much better cared for. (Anesthesiologist)

I notice that they talk to us; they request whatever is missing and prepare the material beforehand. Whatever

is missing: medication, catheter, tube; they go to the nursing department and ask for. (Nurse)

Recognition of weaknesses in the perioperative process

The weakest point of the perioperative care process shown in this study is related to the Post-Anesthesia Care Unit (PACU). There are several reasons, such as the overhead of surgery because it is a tertiary referral hospital for emergency and high complexity. The hospital serves 55 northern municipalities of the State of Ceará and there is no way to regulate the number of patients who are sent to it, which leads to overcrowding, lack of human resources to meet the demand, reflecting on the quality of care in the postoperative period, in addition to not having an anesthesiologist on duty exclusively in the PACU. It is under the care of the nursing team, under the supervision of anesthesiologists who work in the operating room, as represented in the speeches:

The number one point that needs urgent restructuring is the PACU. (Surgeon)

We wish there was greater involvement of physicians in recovery, follow-up, and postoperative care, as does the exclusive physician of PACU. (Nurse)

Due to the marked demand, the recovery room needs to be better structured; it is one of the major stigmas of Santa Casa, one of the great challenges that surgeons, anesthesiologists, and residents face [...] it is a great battle. (Surgeon)

I think that an anesthesiologist to care only for the recovery room is lacking in the sector, and this is a serious mistake [...] regarding PACU, we need more equipment, in addition to an anesthesiologist only for the sector, we need to increase the nursing staff to meet the rising demand. (Anesthesiologist)

Peroperatively, the urgency of establishing a more regular preanesthetic routine, with the possible creation of a specific clinic, is also a recurring discourse.

Outpatient preanesthetic service, it helps to reduce the number of suspended surgeries. (Nurse)

I know I cannot perform the preanesthetic evaluation in all patients, but some are elderly patients undergoing surgery for femoral neck fracture, and post-anesthetic ... we really miss seeing it. (Surgeon)

First thing, improve the pre-anesthetic visit. Pre-anesthetic visit needs to be improved. (Anesthesiologist)

Article 1 of the *Conselho Federal de Medicina* (Federal Council of Medicine) resolution, N° 1802/2006, states that ''Before performing any anesthesia, except in emergency situations, it is essential to know, in advance, the clinical conditions of the patient, leaving up to the anesthesiologist the decision on the desirability or not of the anesthetic act, in a sovereign and non-transferable way: for elective procedures, it is recommended that the preanesthetic evaluation is performed during the medical consultation prior to admission''.

Discussion

Residency is understood as a space for training and continuing education, which may not be limited to a conception of educational specialization project alone. Residency also may not be seen only as a work process. The complexity of its nature and the indissociability of these two aspects highlighted mark a unique and very interesting feature of residency: the recognition and appreciation of the role of work as a key teaching tool of a professional.[10] Within this context are both the preceptor of anesthesiology and the apprentice resident; there is an inseparable exchange of knowledge and a bilateral process of teaching/learning that undoubtedly contributes to improve the quality of care.

The CNRM N° 02/2006 Resolution of May 17, 2006 provides for minimum requirements of medical residency programs, as well as the Brazilian Society of Anesthesiology provides for the regulation of Centers for Education and Training[11] that inevitably leads to progress and improvement in services that purport to be expert trainers. Thus, the expected natural history of a service that hosts a residency program is the production of emancipation and improvement in all aspects, including the management of acute postoperative pain.[12]

The perception that residents, when properly supervised, bring improvements in quality of care comes not only from health professionals who work and live in the sector; patients also perceive the quality of services provided by residents under supervision and are very satisfied, as published evidence.[13]

Studies show that the processes of communication and integration among work teams, particularly between anesthesiologist and surgeon, improve the effectiveness of the results and quality of services provided to patients, impacting on organizational culture services.[14]

It is known that no professional has all tools to meet the health problems, there must be an interdisciplinary approach for an effective teamwork. This may be understood as integrated actions with a common purpose between professionals with different areas of training. This is possible through the recognition of the specificities of each professional, achieved with continuous dialog, seeking to overcome the fragmentation of knowledge and services.[15] The presence of a resident in anesthesia served as a link for the nursing staff and facilitated access to information about anesthetic techniques planned for certain surgical procedure, and also for further clarification of the patient's clinical condition. It was thus seen as improvement in care, with more detailed and closer approach to the patient, with the adoption of a multidisciplinary approach.

The new directions of anesthesiology as a specialty stimulate the adoption of the perioperative medicine practice, whose predominant assumption of care is based on patient safety. In this context, interprofessional education enables the joint learning of team members and promotes a culture of safety.[16] For this, the adoption of a competence-based curriculum is essential in this new educational process. The Anesthesiology Residency at the *Santa Casa de Misericórdia de (city of) Sobral* began planned in the light of a competence-based curriculum.[17]

Surgery and anesthesiology have always been closely intertwined. Inside the growing complexity of therapies and technical skills, disciplines overlap in certain areas. The most important is to understand that the medical specialties are not competitors, but partners. Evidence shows that surgical outcomes can be improved through effective communication and interaction between anesthesiologists and surgeons in multidisciplinary teams, which is highly beneficial for patients.[18]

The presence of the resident can be a driving factor of professionals' reflective practice, understood as the ability to critically reflect on their own thinking and decisions. It motivates the professional to ''perform well'' their activities and causes him to revise his knowledge, study, and ''think aloud''. These actions decrease the automaticity of practice and drive the analytical reasoning and ongoing training. Consequently, there are reduced errors of cognition.[19]

Positive attitudes of interrelationship and behavior transform the workplace and create a favorable atmosphere for adoption of safety checklist proposed by the World Health Organization,[20] as the high prevalence of adverse effects found and documented in hospitals in Latin America infers that patient safety may represent an important public health problem, as has been documented in North America.[21]

PACU requirement in hospitals in Brazil was determined by Ordinance 400 of the Ministry of Health in 1977, A Resolution of the Federal Council of Medicine, N° 1802/2006, which regulates the practice of anesthesia, and states in Article IV that ''after anesthesia, the patient should be transferred to the post-anesthesia care unit (PACU) or intensive care unit (ICU), as appropriate''. It further provides that ''PACU discharged is the sole responsibility of the anesthesiologist''; and that ''in PACU, from admission to discharge, patients remain monitored for: circulation, including measurement of blood pressure and heart rate and continuous determination of cardiac rhythm by cardioscopy; breathing, including continuous measurement of arterial blood gas and pulse oximetry; state of consciousness; and pain severity''.

In a study conducted in Brazil, in 2003, on post-anesthetic care routine of Brazilian anesthesiologists, it was shown that the availability of equipment in PACU grew progressively for practicing anesthesiologists in North/Northeast, Midwest, South, and Southeast regions. The residency program at the institution was associated with the existence of an anesthesiologist on duty 24 h in PACU and the availability of resuscitation equipment and others, such as peripheral nerve stimulator and active heating system.[22] It is assumed that the existence of a residency program induces improvements in quality of service.

Regarding pre-anesthetic care, the outpatient visit for preanesthetic assessment is extremely important in order to stratify risk and plan better for intraoperative and monitoring care, which contributes to increased safety of anesthesia, maintenance of ties, and clarifies questions of patients, reducing the rate of surgery suspension and increasing customer satisfaction.[23] In this study, this is a weakness of the service that needs to be better structured.

Conclusions

The influence of the implantation of the Residency Program in Anesthesiology at a tertiary teaching hospital in the Northeast of Brazil reflected in the anesthetic process and care and in the motivation of anesthesiologists who worked in the institution for professional development, recycling, and implementing improvements in anesthetic practice. The resident presence worked as an interdisciplinary link between anesthesiologists, surgeons, and nurses and greatly improved patient perioperative care and safety. However, reflecting on the process flow and quality of care, there was recognition of the weaknesses related to pre- and post-anesthetic care, identification of the deficiencies and actions to overcome them. A residency program, whose implementation was planned as a participative process of anesthesiologists who make up the clinical staff, yields group motivation and results in advances, scientific updates, reflections on care processes, improvements in quality of care, recognizing weaknesses and development of action plans to promote continuous advances in education, care, and assistance.

Conflicts of interest

The authors declare no conflicts of interest.

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