BREAST SURGERY COMPETENCY-BASED EDUCATION: TRANSFORMING HUMAN RESOURCES FOR BREAST HEALTH

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Abstract

Background and Rationale*: Breast surgical training is undergoing many changes. A number of institutions in high, middle and low income countries, due to the growing of breast disease, have started to adopt an outcomes-based education base on achievement of competencies, but none published methodologies are available on how best to design and which will be challenges facing this educational approach in the context of resource availability and population-based need. The purpose of this article is to describe a general methodology, to guide the design of breast surgery*

competency-based training program (BSCBTP) adapted to existing infrastructure and resources.
Design: *The BCSBTP methodology process involves**:*** ***First:*** *Reviewing of published work and commissioned papers relevant to competence-based surgical education.* ***Second:*** *Selecting by functional analysis of professional profile and key points* ***Third:*** *Outlining competencies* ***Fourth:*** *Defining criteria performance of roles or domains of competencies* ***Fifth****: Recognizing of expected level of domain of their related competencies to be achieved at each stage of training; and* ***Sixth:*** *Designing program: Identifying learning objectives; Selecting a learning environment to frame the institutional design; Defining a set of targeted knowledge, skills and attitudes, Choosing training scenario; Developing an evaluation tool.*
Setting: *This program is conducting at the Caracas University Hospital, a tertiary care academic teaching hospital.*
Discussion: *Designing a training model in countries with financial constraint and inadequate infrastructure represent a comprehensive re-engineering effort in order to identify key innovations and the underlying factors of success for it implementation, scale up and replication.*

Key words: *Breast Surgery, design, competence-based education, training, program, health planning, resource-constrained countries.*

1. Background And Rationale

Breast diseases comprise an area of growing public interest and professional knowledge, due to scientific and technological advances in its screening, diagnosis and treatment, at a time of rapid demographic and epidemiological transitions, leading to a constant updating of knowledge, which in many cases are insufficient or have not been previously acquired during the surgical residency programs.[1] According to the World Health Organization, the current

global shortage of health personnel is 7.2 million of providers and it is estimated to grow to 12.9 million in the year 2015.[2] This shortage is further aggravated in countries with economic crisis and political instability, where trained personnel choose to emigrate in pursuit of better opportunities for career development, migrate from *less* densely *populated* areas to densely populated areas across countries, or transition from public to private health sectors contributing to the overall shortage and limiting health system performance.[3-7] Therefore, we are facing quantitative and qualitative imbalances in breast health workforce.

It is therefore vital to strengthen accessibility, acceptability, quality and productivity of the health workforce in order to build resilient health system, capable of meeting the needs of populations in an equitable and efficient manner.[2] This requires not only training and supporting current and new breast health care providers, but also providing adequate access to professional continuing education to participate in patient-centered and population-centered breast health system. To achieve this challenge it is necessary to expand the borders in surgical education to ensure that breast surgeons develop competencies will be tailored to the resource availability and will be support by team-based learning that will be driven the medical-decision-making process for the benefice of patients and the best health outcomes in the community being served.

Competency: A Polysemic Term

In the first decade of the twenty-first century, a new linguistic label took the academic scenarios in the field of educational theory. The term *Competency* has been positioned itself in a mandatory call for reviewing on what is "taught" and "how it is taught". This sort of euphoria has brought as a result that in almost all cases, universities and educational institutions that prepare professionals in different areas started to

wonder what competencies are, and what structural changes would be involved in this curricular designing, as consequence of the separation between that is instructed in the classrooms and that is required to enter the labor market.

For many people involved in the educational context, the word *Competency* creates a lot of confusion; it is filled and emptied from an alluvium of meanings. When we review the literature, we find a sort of "*linguistic Babylon*". Some theorists allude it to executions, concrete actions, evidence of achievement and others classify it into multiple areas such as: communicational, personal, of citizenship, disciplinarian, transversal, methodological, generic, basic, professional, and this just to mention a few of them.

Barriga[8] in this sense has stated that:"A difficulty emerges to identify what is the origin of the term competency and its use in education, not only by the lexicological confusion, but also because of the lack of precision concerning its emergence. For some authors this issue originated in the working world and then, is reflected in the scope of specialized technical training where a relatively simple task analysis makes it possible to clarify the main activities that should be done."

Expertise, Proficiency and Competence: Beyond Practice

Rial Sánchez[9] has added these two concepts to ensure the understanding of competency in its proper dimension: "*Proficiency* is the expression of the competency (…).*Expertise* is defined as the skills or abilities that allow us to solve a task when required conditions are present." Ericsson[10] has shown that *Expertise* emerges because of continued "deliberate practice" over many years. Once you get enough expertise, proficiency will be achieved, consequently a training model should find the way to become trainees adequately proficient.[11]

Nowadays, there is a call for reform in surgical education, that is facing tough odds and when the context is a developing country the complexity is geometrically increased. Emerging as a educational paradigm, competency-based training contemplates specific parameters of knowledge, clinical reasoning, technical skills, professional attitudes and judgment,.[13] In low and middle income countries, the design of this kind of program should include the establishment of those competencies, which not only refer to educational system, but also to health system, taking into consideration the context of resource availability and population-based needs, for giving answers to asymmetries.[13]

Competency-based surgical education is focused to highly individualized learning process rather than the traditional, "one-size-fits-all,"[14] and at the same time allows educational improvement, fighting against the system´s natural resistance to change or what is often known as the "not invented here" syndrome. The opportunity is in eradicate the fragmented, outdated and static system that produces a low-skilled workforce, with weaknesses in interprofessional and transprofesional approach and lacking of necessary leadership to resolve "real life" problems of their own health system.

Improving health-system performance in breast health care is a difficult endeavor requiring not only the initial commitment to change, but also ongoing effort tied to specific educational goals. System improvements will require creativity and determination to face realities. Efforts are most likely to succeed when they are part of innovative reform, but innovation cannot thrive without educational research that allow to identify the most effective patterns of educating breast surgeons. Consequently, the aim of this article is to describe a general methodology, to identify the competencies required for facing health system weakness and to

guide the design of breast surgery competency-based training program using existing infrastructure and resources and finally discuss how overcome barriers that impede its implementation.

2. Practice Contextualization

Although a number of breast surgical training have started worldwide, the debate about how this should be implemented in developing countries using scarce resources and dysfunctional infrastructure.[15] Therefore, educational strategies in these countries must be sought to achieve effective and sustainable delivery of care. Reliable and valid strategies[13] to develop a comprehensive, proficiency-based training program for achieving this goal should be:

- Establishing a joint work plan between education and health system for prioritizing the educational outcomes deemed necessary to train a breast surgeon, aligning pedagogy and assessment into programs.[16] This cooperative work provides greater accountability, flexibility and learner centered, with the necessary balance between social purpose, content of education and community needs.
- Identifying the competencies required for changing health system performance, by addressing a specific health problems with the available resources, through a functional analysis to determine competencies by taking professionals´ roles and breaking them into their component behaviors,[17,18] and in this way to identify and remove irrelevant elements from the program.[19]
- Encompassing networks between tertiary hospitals and primary care settings. This provides a balanced environment for education, engaging professional with local communities favoring continuity of patient care.

- Focusing in interprofessional and transprofessional education, through the recognition of the importance of interprofessional teamwork within the professional practice, for integrating multidisciplinary approach to the management of breast diseases that breaks the traditional primary surgical model of episodic sequential treatment; and through the promotion of transprofessional teamwork, for including non-professional health workers (basic and ancillary health workers, administrators and managers, policy makers, and local community leaders).
- Nurturing of a culture of critical inquiry and scientific research as a central function to generate knowledge, ethical deliberation, and public reasoning to activate social transformation.

Pedagogical Framework: *The Being of the Curricular Surgery*

The pedagogical framework focuses on addressing the linkage between the education system and the health care system, centering on population, since it constitute the base and the driver of the need and demand in these systems, therefore that is essential that the educational system and the health system co-produce and design the learning environment and instructional strategies. To create a valid tool to train fellows toward operative proficiency, we performed six steps framework for designing a competency-based training program.[20] **(Figure 1)First:** Reviewing of published work and commissioned papers relevant to competence-based surgical education and we selected: CanMEDS by the Royal College of Physicians and Surgeons Of Canada,[21] Tomorrow´s doctors,[22] The Intercollegiate Surgical Curriculum Programme (ISCP),[23] the American Accreditation Council for Graduate Medical Education

(ACGME),[24] Future of Jobs,[25] European Training Requirement for Breast Surgery,[26] Breast Surgical Oncology Fellowship Curriculum and Minimum Training Requirements,[27] as well as the review of local literature: Profile of Professional Competences of "Luis Razetti" Medicine School-Venezuelan Central University,[28] and Competence-developing Model by Metropolitan University of Venezuela.[29] **Second:** Selecting by functional analysis of professional profile and key points that would be removed or would be adopted and subsequently adapted to our own reality. **Third:** Outlining competencies that breast surgery training program should teach and evaluate (generic and high-level), and that graduating trainees should be able to adequately achieve. **Fourth:** Defining criteria performance of roles or domains of competencies that are considered necessary to ensure patient safety throughout the training program. **Fifth**: Recognizing of expected level of domain of their related competencies to be achieved at each stage of training; and **Sixth:** Designing program taking into consideration trainees´ performance through the competence-based training. This Competency-based Breast Surgery Training Program process involves:

- Identifying learning objectives that are rooted in context of resource availability and population-based need;
- Selecting a learning environment to frame the institutional design;
- Defining a set of targeted knowledge, skills and attitudes that capture learning objectives.
- Choosing the training scenario that provide known opportunities for surgical trainees achieve the targeted knowledge, skills and attitudes;
- Developing an evaluation tool to assess trainees´ performance.

3. Competencies

Of the 22 generic competences endorsed by Metropolitan University of Venezuela,[28] a total of six generic competences were chosen to be the focus of our training with their domains of competencies: entrepreneurial attitude, learning engagement, social accountability, use of information and communication technologies (ICTs), critical analysis and problem solving. For high-level required competencies, were endorsed ACGME core competencies: Clinical Knowledge, Patient Care, Interpersonal & Communication Skills, Practice-based learning, Professionalism, System-based learning.[24] For these competencies, the roles proposed in which every surgical trainee should be proficient are: Leadership, teamwork, environment understanding, health advocacy and empowerment (encourage trainees to offer insight into the effectiveness of the educational program, which can further help with program improvement).[30]

Learning Objectives

- Understand the performance of health system by adapting core professional competencies to resource availability and population-based.
- Generate rational and strategic decision making based on evidence, as well as implement or improve organized and proven population-based interventions.
- Participate in breast health program not only tertiary hospital centers but also networks of secondary and primary health units, including community-based programs.
- Promote collaborative and non-hierarchical relationships in effective teamwork.

- Understand ethical deliberation and notions of social justice in decision making.
- Exhibit leadership attributes as change agents, competent managers of resources, and promoters of evidence-based policies.
- Recognize research as essential endeavor to mobilize scientific knowledge for generating social transformation.

Learning Environment*: *Institutional Design

Breast Surgery Training Program is conducted at the Caracas University Hospital, a tertiary care academic teaching hospital that serves as a core resource for venezuelan health care network, both for providing tertiary care of referred patients from peripheral regions of the country and for supporting a primary care center. The program is affiliated to and governed by breast unit, an approach to organizing multidisciplinary care, including surgery, radiation therapy, medical oncology, pathology, and radiology.[31,32] The breast unit is included within the administrative organization chart of this hospital.

The breast fellows' clinical responsibilities are in accordance with the guidelines of governing resident review bodies of the Caracas University Hospital, so there is not conflict with the regular residency program, this means that the fellows´ experience is not diminished or diluted by the experience of resident in their final year of training. In this institution all graduate medical education-approved training programs are financing and accrediting by National Minister of Health. The applicant must hold a current license as a surgeon or gynecologist. Criteria for admission are linked to breast training purpose, so a competitive merit-based admissions policy is made to obtain balanced rural and socio-

cultural composition highlighting the program intention of advancing health equity.

The faculty is integrated by breast unit attending´s to ensure that trainees should be adequate opportunity to interact with clinicians in companion breast specialties (radiology, pathology, medical oncology, radiation oncology and plastic and reconstructive surgery). Each attending is a recognized authority in her/his particular field of expertise, also with evidence of scholarly activity in breast disease, who undertake to impart his/her clinical knowledge and skills to trainees.

Pedagogical Format

The Breast Surgery Training Program consists of one year of continuous education and training, with six subjects: breast clinics, operating room, multidisciplinary meetings, rotations and research. This curriculum addresses the 3 core components of knowledge, technical skills and attitudes. (TABLE 1) Clinical experience at breast clinics scheduled two days per week must include: Initial outpatient assessment, preoperative decision-making, perioperative management and patient follow-up. Clinical training in surgical management of breast diseases is required, with two operating list per week. Before going into operating room or performance breast procedures, the instructor should pre-brief trainees, and after them, there should be time set aside for a trainee debrief. This ensures that lessons learned are clarified and implemented.

Whole year rotations on subspecialty services: radiology, pathology, medical oncology, radiation oncology and plastic and reconstructive surgery allow break down professional silos, updating the traditional surgical model of care, characterized by episodic sequential treatment rather than a comprehensive approach, while enhancing collaborative relationships and team-based education. For reinforcing this understanding of the integration of

specialties in treatment of patients, the trainees must participate in a weakly multidisciplinary case conference.

Scholarly activity is developed through a weekly schedule didactic program: faculty lectures, journal club and presenting relevant literature at multidisciplinary case meetings. Trainees require using Information and Communication Technologies that include the Open Educational Sources of Guidelines[33] to increase the active involvement and decreasing the dependence of the instructor for content. All trainees must use a web-based operative logbook to document trainee´s academic career, and list of all required content about diagnostic and therapeutic procedures that have been complete. Each fellow´s operative logbook should be reviewed regularly for the program director to address and correct operative experience deficiencies. Research activity based on implementation science and protocol-driven care, must be included in the training program, like a strategy to build local research infrastructure and generate national evidence-based policies. Presentation at national meetings and publications in peer-review journal is expected.

4. Assessment

During the training program we use a formative and summative assessment Formative is the skill, knowledge and attitudinal (KSA) coaching and testing providing feedback to the surgical trainee thorough the learning process. We use multiple assessments (program director, instructor, faculty and nurse/staff) each with a focus on specific KSA, as a means to gain insight into a trainee´s level of competency. Raters only asked to score the presence or absence of the target behaviors. These evaluations should be

obtained from clinics, operating room, rotations and multidisciplinary meetings.

Summative assessment consist of a written and an oral part examination. The maximum score for the entire exam is 20 points with 15 points as the limit to pass. The written examination consists of multiple choice questions. The oral examination consists of two tasks. One task is clinical cases discussion and other is to evaluate a clinical research paper.

5. Discussion

Designing a training model in countries with financial constraint and inadequate infrastructure represent a comprehensive re-engineering effort in order to identify documented methods, processes, systems, and techniques that are effective in achieving "best practices." Applied to surgical education, best practices means to understand what happens in the teaching environment, that is different around the world, to achieve quality educational outcomes,[34] consequently there is no choice other than prioritizing educational innovations.

Through the design of breast surgery competency-based training program (BSCBTP) adapted to existing infrastructure and resources, we exposed key innovations and underlying factors of success for implementation and we underpinned important lessons for scaling and replicating it:

1. Adapt competency-based goals to social-cultural context and economic reality. Each country must tailor its own approach based on its unique circumstances.
2. The institution where the training program develops must meet basic standards accreditation, as well as education environment. It must have a group of medical specialists dedicated to the formation and willing to train breast surgeons (service-based model), so they will became into faculty members, because

staffing it is a hurdle. For multidisciplinary education, health needs teamwork, and this need has grown the importance of the breast unit concept, as an approach to organizing multidisciplinary breast care,[32] in a cost-effective way, being a viable strategy in certain limited resource settings. Every country should strive to establish at least one center of excellence and breast surgery training program should be integrated into that infrastructure.[4]

3. Primary health-care training should be integrated into the program, favoring continuity of care and ensuring universal social protection in health, [35] this proactively engagement with local communities leads the production of academic and community-based breast specialist.
4. Multi-stakeholder partnership are critical to both quality and sustainability of program; engagement not only with educators, health personnel, medical societies, but also with national and local leaders to achieve and maintain the program and the results. This leadership within the professional and academic communities, but it must be backed by state policies and the advocacy of Non-Governmental Organizations.
5. Innovative financing mechanism from all sources: public, private, development aid, and foundations can counter demand side constraint and impedes a program´s capacity for scale up.
6. Curriculum, instructional practices and the indicators of achievement of the competences must be clarified. The curriculum must be plan and development for faculty, so effective use of ITCs and open access education can be alternatives to supplement the program education, to modernize pedagogy and to complement teaching environment. So, the parallel develop of surgical on-line curriculum[36] that will be the next step for offering training to remotes sites and in-house

interactive self-study. Although, assessments with a wide variety of methods are integral to the competency-based approach, the remaining challenge is "the creation of tools that are valid, reliable and predictive,"[18] focus on the progress or shortcomings in achieving competencies.

6. Conclusion

The implementation of breast surgery competency-based training is currently underway to determine the educational effectiveness of the training institutional and instructional design. Considering that in low and middle income countries this kind of program must be tailored to the specific financial constraints and population needs. Our believe is that this design will generate highly trained breast surgeons, capable of reducing and eliminating the disparities and will be the next generation of leaders and advocates in breast health.

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