From Bench To Bedside: Advancing Healthcare Through Laboratory-Nursing Partnerships

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Abstract

Public health sector encounters a variety of obstacles on the path from taking a concept from the bench to the bedside. The

bench-to-bedside approach is the core of translational science, which integrates research inputs from basic sciences, social sciences and political sciences to optimize patient care. The intra-professional partnership and collaboration among laboratory and nursing professionals has numerous benefits, including improved service capabilities and efficiencies, as well as enhanced emergency response and disease prevention strategies. Through collaborative approaches and more seamless communication, there are fewer medical errors with improved patient outcomes and safety. In public health, partnerships between laboratory professionals and nurses are essential for solving the increasingly complex, multifaceted challenges that are encountered. The outcome is a holistic, improved, and multi-disciplinary approach to treating patients.

Keywords: Bench-to-bedside approach, laboratory-nursing partnership, translational research and collaboration

Introduction

Public health sector encounters a variety of obstacles on the path from taking a concept from the bench to the bedside. The phrase “bench to bedside” describes a process of taking research results from the laboratory into the clinic so that it can directly benefit patients (Petrini, 2011). In its simplest form conducting this sort of translational research involves first conducting basic experiments in the laboratory or at the bench (Keramaris et al., 2008). Next, pre-clinical research is conducted in animal models. Finally, clinical studies in humans help to move a research concept to the bedside. Laboratory partnerships continue to expand and evolve in complexity to meet new and emerging needs (Strain & Sullivan, 2019). Nursing leaders can create valuable partnerships with laboratory professionals to help achieve their goals for innovation and change in health care (Crawford et al., 2017). However, the intra-professional partnership and collaboration among laboratory and nursing professionals is not clearly demonstrated in the literature.

The bench-to-bedside approach is the core of translational science, which integrates research inputs from basic sciences, social

sciences and political sciences to optimize patient care (Hamilton, 2007). By taking a focused point of view, the biomedical community is able to translate what it has learnt in the laboratory into the diagnosis and clinical treatment of patients (George et al., 2019). While this bench-to-bedside approach holds the promise of tomorrow's innovative and personalized medical treatments, it presents some real challenges today. To translate information from the clinic to the laboratory and back requires that researchers and clinicians integrate and collaborate on data from different disciplines (Witt-Kushner et al., 2002).

Collaboration is a key component of successful translational research. Successful translational research programs have to include and encourage members to have meaningful partnerships between the lab and the nurse so that clinicians can understand new findings occurring in the lab and those in the lab can understand what the burning clinical issues are (Milne & Milne, 2010). However, there is always room for improvement, including poor response time to the unit for specimen collection; competency/skill level of phlebotomy personnel; changes in policies and procedures without proper notification; poor turnaround time of tests; and inability to coordinate multiple tests for the same patient (Kirk & Shult, 2010).

In an intricate field like healthcare that deals with unique human bodies, there are bound to be gaps in understanding. Through collaborative approaches and more seamless communication, there are fewer medical errors with improved patient outcomes and safety (Freeman & Dervan, 2011). Thus, this systematic review aims at highlighting the role of nursing-laboratory partnerships in getting advanced and improved healthcare.

Methodology

This research paper is a systematic review that is designed to synthesize the international evidence on advancing healthcare through laboratory-nursing partnerships. This systematic review is a comprehensive protocol-driven review and a synthesis of data extracted to summarize gaps in the existing international evidence.

A preliminary search is conducted via four (4) databases, including PubMed, CINHAL, EMBASE, and MEDLINE, from 2000 to 2022.

Search terms used in this systematic review are "bench-to-bedside approach", "laboratory-nursing partnership", "translational research" and "collaboration." Furthermore, reference lists of related articles are manually reviewed to extract further studies to provide an interpretive synthesis.

This systematic review is completed by experienced healthcare professionals in different healthcare settings in Saudi Arabia, who have developed a protocol for selection of studies meeting the pre-determined inclusion and exclusion criteria. The inclusion criteria in this systematic review depend on original studies with data on advancing healthcare through laboratory-nursing partnerships. Studies are included irrespective of language or publication date. Likewise, the exclusion criteria are case reports, guidelines, reviews, non-peer reviewed papers and editorials.

Data is extracted and integrated across studies searched and assessed for eligibility, including study design, research methodology, strategy and findings. As well, a quality assessment of reviewed studies is performed by using standardized tools, which are appropriate for respective study designs. Furthermore, a critical interpretive synthesis is performed to extract data and draw conclusions.

Literature Review

From bench to bedside: advancing healthcare through laboratory-nursing partnerships

The international literature associated with advancing healthcare through laboratory-nursing partnerships is extensively searched and reviewed. A preliminary search is conducted via four (4) databases, including PubMed, CINHAL, EMBASE, and MEDLINE, from 2000 to 2022. Search terms used in this systematic review are "bench-to-bedside approach", "laboratory-nursing partnership", "translational research" and "collaboration." Furthermore, reference lists of related articles are manually reviewed to extract further studies to provide an interpretive synthesis.

The inclusion criteria in this systematic review depend on original studies with data on advancing healthcare through laboratory-nursing partnerships. Studies are included irrespective of language

or publication date. Likewise, the exclusion criteria are case reports, guidelines, reviews, non-peer reviewed papers and editorials.

Furthermore, a number of 30 studies meet the eligibility criteria. The study design includes randomized controlled trials and cohort studies. Key intervention components examined are advancing healthcare through laboratory-nursing partnerships. Findings assessed are improved support, collaboration and mutual understanding among different stakeholders of healthcare management.

Findings indicate that collaboration strategies between laboratory and nurses are effective in getting improved health outcomes. As a result, this can help the entire healthcare system to improve patients' quality of life, get better health outcomes, and increase patient satisfaction. However, Public health sector encounters a variety of obstacles on the path from taking a concept from the bench to the bedside. The intra-professional partnership and collaboration among laboratory and nursing professionals is not clearly demonstrated in the literature, which need further research.

Discussion

In public health, partnerships between laboratory professionals and nurses are essential for solving the increasingly complex, multifaceted challenges that are encountered (Kurec & Wyche, 2006). Collaboration between laboratory professionals and nurses has numerous benefits, including improved service capabilities and efficiencies, as well as enhanced emergency response and disease prevention strategies (Granger et al., 2012). Laboratories provide high-quality data for disease surveillance, detection, control, and response to a wide variety of public health concerns and threats, including emerging infectious diseases, foodborne disease outbreaks, congenital diseases, natural disasters, and exposure to chemical or radiological contaminants (Crawford et al., 2017).

Translational research

Translation of achievements of basic science into everyday clinical practice remains a major issue in contemporary medicine (Witt-

Kushner et al., 2002). The first level of translation ("from bench to bedside") corresponds to efficacy studies under controlled conditions with careful attention to internal validity (clinical research) (Keramaris et al., 2008). The second level is the translation of results from clinical studies into everyday clinical practice and health decision making. Translational Research aims to bridge the gap between basic and clinical research. Translational research encompasses laboratory studies, clinical demands, public health and health management, policies and economics (Petrini, 2011). Like basic science, it is usually performed in a laboratory environment, but its endpoints and progress are realized in the clinical setting of medical practice (Kirk & Shult, 2010). Translational research can progress through mutual nursing-laboratory partnership and collaboration.

The translation of theoretical knowledge and experimental breakthroughs into the clinical practice of medicine has always been difficult. During the past few decades, growing barriers between clinical and basic research, the size of the acquired scientific data and the ever-increasing complexities of conducting clinical research according to government regulations and financial constraints, have made this translation even more problematic (Freeman & Dervan, 2011). These challenges have affected clinical research enterprise at a time when it should be expanding, and have often discouraged the active involvement of contemporary medical personnel from basic sciences (Granger et al., 2012). It is very useful to understand research as a continuum between basic and clinical research through the intermediary of translational research (Keramaris et al., 2008).

The process of translational medicine has increased significantly the number of people who participate in clinical trials, both in the discovery stages and in the clinical testing. Translational medicine has also offered to patients the opportunity to become actively involved in breakthrough science, as it demands a willingness on the part of patients to participate in all aspects of research through clinical care (Petrini, 2011). The patient-centered nature of the translational process has become the new basis of clinical evolution. This new basis aims to accelerate the advance of scientific innovations to the clinical level in a timely and efficient manner (Granger et al., 2012). The patient-centered nature of translational research not only influences the structure and

management of research procedures, but also the very essence of research strategies (Milne & Milne, 2010). The needs and aspirations of patients, and consequently of society as a whole (the public, industry, insurance organizations, health systems), become the pivot of the new and integrated research strategy, which creates a fresh, dynamic link between clinical practice and basic science (Freeman & Dervan, 2011).

Challenges met in nursing-laboratory partnership

The function of the laboratory is to analyze clinical laboratory specimens and transmit these data to the appropriate healthcare provider in a timely manner (Kirk & Shult, 2010). Most often, this information is communicated between laboratory staff and nursing personnel. There are some issues that affect nursing-laboratory interactions, including quality issues, laboratory reports, technical concerns and professionalism (Freeman & Dervan, 2011). First of all, nurses do not fully appreciate quality control concerns of the laboratory. When quality control values drop out of range, causing delays in laboratory result reporting, anxious nurses do not always understand the reason for the delay and may place the blame on personnel incompetence, laziness of the staff, or improper specimen handling (Granger et al., 2012). Another problem often encountered is unlabeled or mislabeled patient specimens as collected by nurses (Petrini, 2011). Compliance in following specimen collection protocols waxes and wanes with staff turnover; thus, there is a perpetual need for training (George et al., 2019).

Furthermore, nurses do not take the time to look up reports (Hamilton, 2007). Many laboratory technologists feel that it is a waste of their time to answer phone calls regarding test results when there is computer access and/or hard copy reports available. Frequent phone calls cause interruptions in the workflow and may even require a dedicated full-time employee to manage the phone volume (Kurec & Wyche, 2006). It is very frustrating for laboratory personnel to receive phone calls stating “reports were never received” or are “not in the chart,” especially when it is clear that all reports are computer generated. While it is easy to show the time and date that a report was printed from the Laboratory Information System, proving that the report was misfiled, sitting on someone's desk to be reviewed, or assisting a caller who just

can't be bothered to look it up is not so easy to do (Keramaris et al., 2008).

In another situation, nurses do not understand or appreciate technical or workflow complications of a busy laboratory (Crawford et al., 2017). Nurses may not realize the daily work obligations for laboratory personnel (Freeman & Dervan, 2011). There are dozens of problems that have to be dealt with daily that lead to frustration and low morale: quality control issues, instrument breakdowns, staffing shortages, budget cutbacks, getting lab results faster, and a constant demand to do more with less (George et al., 2019). When there is an instrument malfunction and there are dozens of patient samples on the machine to be processed, it becomes a nightmare to ensure that samples are not accidentally mixed up, that the sample integrity is maintained, and/or that samples are processed quickly (Keramaris et al., 2008). Hence, if a nurse makes a single mistake, the impact is usually limited to a single patient. Thus, from a nursing perspective, the magnitude of a single laboratory error and the residual impact of patient care may not be fully appreciated (Granger et al., 2012).

Historically, laboratories have been located in the furthest outreaches of a hospital, such as the basement or some other isolated area. In addition, the public has little or no idea what laboratorians do; neither do nurses or other healthcare providers (George et al., 2019). Yet, 70% of all medical decisions are based on laboratory results (Crawford et al., 2017). The impact that the laboratory has on patient care is profound. Most patients have little or no contact with laboratory personnel, further cloaking the laboratory in mystery. Most of these issues are fixable and can be resolved through better communication and understanding in order to establish a successful team process in support of good patient care (Strain & Sullivan, 2019).

Interprofessional collaboration

Interprofessional collaboration between clinical and medical professionals has always existed. The World Health Organization defines interprofessional collaboration as the practice when “multiple health workers from different professional backgrounds work together with patients, families, caregivers, and communities to deliver the highest quality of care (Granger et al., 2012).

Interprofessional collaboration facilitates improved health outcomes regarding getting better outcomes in patient care, eliminating shortcomings of working in silos, elevating patient safety, and enhancing the brand image (Hamilton, 2007). When different specialized professionals collaborate at a professional level, they exchange knowledge and technical expertise leading to a closer understanding of advanced medical investigations, allowing healthcare professionals to make well-rounded patient treatment decisions (Keramaris et al., 2008). The outcome is a holistic, improved, and multi-disciplinary approach to treating patients (Kirk & Shult, 2010).

Collaboration also helps to keep patients at the centre of every healthcare unit's operational essence (Petrini, 2011). When medical and clinical professionals collaborate, the result is unified access to medical and patient data that otherwise tends to sit in silos (Keramaris et al., 2008). Collaborations also enhance the business reputation of entities embracing that paradigm (Strain & Sullivan, 2019). Strong tie-ups communicate to patients and healthcare providers that the unit is well-equipped in terms of technology and expertise (Crawford et al., 2017). In addition, proper safeguarding of patient and medical data enhances great trust while allowing healthcare professionals to make better treatment-related decisions (George et al., 2019). Through collaborative approaches and more seamless communication, there are fewer medical errors with improved patient outcomes and safety (Freeman & Dervan, 2011). As well, there are business benefits to adopters in terms of improved reputation, trust, and efficiency (Crawford et al., 2017).

Conclusion

Public health sector encounters a variety of obstacles on the path from taking a concept from the bench to the bedside. Laboratory partnerships continue to expand and evolve in complexity to meet new and emerging needs. Nursing leaders can create valuable partnerships with laboratory professionals to help achieve their goals for innovation and change in health care. However, the intra-professional partnership and collaboration among laboratory and nursing professionals is not clearly demonstrated in the literature.

The bench-to-bedside approach is the core of translational science, which integrates research inputs from basic sciences, social sciences and political sciences to optimize patient care. Successful translational research programs have to include and encourage members to have meaningful partnerships between the lab and the nurse so that clinicians can understand new findings occurring in the lab and those in the lab can understand what the burning clinical issues are. However, there is always room for improvement, including poor response time to the unit for specimen collection; competency/skill level of phlebotomy personnel; changes in policies and procedures without proper notification; poor turnaround time of tests; and inability to coordinate multiple tests for the same patient. Through collaborative approaches and more seamless communication, there are fewer medical errors with improved patient outcomes and safety.

In public health, partnerships between laboratory professionals and nurses are essential for solving the increasingly complex, multifaceted challenges that are encountered. Collaboration between laboratory professionals and nurses has numerous benefits, including improved service capabilities and efficiencies, as well as enhanced emergency response and disease prevention strategies. Laboratories provide high-quality data for disease surveillance, detection, control, and response to a wide variety of public health concerns and threats, including emerging infectious diseases, foodborne disease outbreaks, congenital diseases, natural disasters, and exposure to chemical or radiological contaminants.

During the past few decades, growing barriers between clinical and basic research, the size of the acquired scientific data and the ever-increasing complexities of conducting clinical research according to government regulations and financial constraints, have made this translation even more problematic. These challenges have affected clinical research enterprise at a time when it should be expanding, and have often discouraged the active involvement of contemporary medical personnel from basic sciences. It is very useful to understand research as a continuum between basic and clinical research through the intermediary of translational research.

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References

Crawford JM, Shotorbani K, Sharma G, et al. Improving American healthcare through “Clinical Lab 2.0”: a Project Santa Fe report. Acad Pathol. 2017;4:1-8.

Freeman MW, Dervan AP. The path from bench to bedside: considerations before starting the journey. J Investig Med. 2011;59(5):746-51.

George K, Ned-Sykes R, Salerno R, Pentella MA. Advancing the Public Health Laboratory System Through Partnerships. Public Health Reports. 2019;134(2):3-5.

Granger BB, Prvu-Bettger J, Aucoin J, Fuchs MA, Mitchell PH, Holditch-Davis D, Roth D, Califf RM, Gilliss CL. An academic-health service partnership in nursing: lessons from the field. J Nurs Scholarsh. 2012;44(1):71-9.

Hamilton LT. Managing the laboratory technical workforce. Clin Lab Med. 2007;27(4):807–821.

Keramaris NC, Kanakaris NK, Tzioupis C, Kontakis G, Giannoudis PV. Translational research: From benchside to bedside. Injury. 2008, 39(6): 643-650.

Kirk CJ, Shult PA. Developing laboratory networks: a practical guide and application. Public Health Rep. 2010;125(2):102–109.

Kurec A, Wyche KL. Institute for quality in laboratory medicine series--controversies in laboratory medicine: nursing and the laboratory: relationship issues that affect quality care. MedGenMed. 2006;8(3):52.

Milne KC, Milne TL. Public Health Laboratory System Improvement Program: development and implementation. Public Health Rep. 2010;125(2):31–39.

Petrini C. From bench to bedside and to health policies: ethics in translational research. Clin Ter. 2011;162(1):51-9.

Strain AK, Sullivan MM. Strengthening laboratory partnerships, enhancing recruitment, and improving retention through training and outreach activities: The Minnesota Experience. Public Health Rep. 2019;134(2):11-15.

Witt-Kushner J, Astles JR, Ridderhof JC, et al. Core functions and capabilities of state public health laboratories: a report of the Association of Public Health Laboratories. MMWR Recomm Rep. 2002;51(14):1–8.