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Research Article

Perceptions of Interdisciplinary Collaboration and Communication: A Comparative Study

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Abstract

The purpose of this quantitative descriptive study is to compare the perceptions of collaboration and communication of individuals from various health care disciplines who have participated in an interdisciplinary training experience and individuals from various health care disciplines who have not participated in an interdisciplinary training experience. As the World Health Organization's [1] Framework for action in inter-professional education and collaborative practice. Health Professions Network Nursing and Midwifery Office focused on fortifying the health care system to improve the quality of patient outcomes through interdisciplinary preparation, it was clear that collaborative educational opportunities were needed in health care education across multi disciplines. Billings and Halstead's Teaching in nursing: A guide for faculty [2] also acknowledged that the future of nursing education needed to include interdisciplinary health care collaboration and communication efforts. A convenience sampling of fifty participants from an orientation session of new employees and fifty employees participating in a simulation exercise were surveyed using the survey tool PINCOM-Q: Perception of Inter-Professional Collaboration Model Questionnaire using a 7-point Likert scale response. The research results were evaluated for the effectiveness of selecting and using the social identity theory as the foundation of its theoretical framework as well as its limitations. A segmented portion of the results proved significant in quantifying there was a difference in individual perceptions of interdisciplinary collaboration and communication. Whereas, a more significant portion of the results revealed there was not a significant difference in these perceptions. Additional research was recommended in order to make a definitive statement on whether interdisciplinary collaboration is affected by participant perceptions of being viewed as an individual, group, or organization team member.

Introduction

Introduction to the Problem

According to the American Association of Critical-Care Nurses [3] and the Joint Commission for Accreditation of Health Care Organizations [4] reported that lack of effective communication has been the leading cause of detrimental patient outcomes over several years. Effective interdisciplinary collaboration and communication to improve teamwork, build relationships, and improve patient outcomes across the healthcare spectrum is needed. Individual healthcare disciplines such as medicine, nursing, and other health services rely on interdisciplinary collaboration to formulate a plan of care for patients. Galloway [5] indicated that

minimal collaboration exists between healthcare disciplines and continues to be limited to each specific disciplines' scope of practice, adhering only to their scope of practice. Although interdisciplinary education and training approaches in other disciplines such as in the military were utilized from the mid-17th century and aviation since 1980, but the inter-professional teamwork approach to health care was a relatively new concept [6].

The dividing lines between the hierarchical levels of professions of the health care team are fading, and it is necessary to determine if individual perceptions of interdisciplinary interaction in the learning environment will improve inter-professional collaboration and communication among the

health care team. The American Hospital Associations (AHA) Physician Leadership Forum held in 2011 identified the lack of interdisciplinary communication and training as a barrier to team building and providing optimal patient care. The American Hospital Association (AHA) Physician Leadership Forum [7] was a report that described the need for high quality team approach to patient care and recommended interdisciplinary educational training programs to improve interdisciplinary behaviour and the interdisciplinary communication process. This research study was designed to investigate the perceptions of interdisciplinary collaboration and communication among various healthcare disciplines. This study may also add to the findings of the American Hospital Association (AHA) and encourage both physician and nurse educators to embrace interdisciplinary educational training. This restructuring might allow for a better understanding of shared roles and responsibilities and elicit better patient outcomes.

Background, Context, and Theoretical Framework

The background and context for this study includes identifying current information surrounding the issue of interdisciplinary collaboration and communication as well as relevant history on the issue. The research will discuss the state of the situation surrounding the problem and the primary reasons for an investigation of the problem. The social identity theory selected served as the theoretical framework for this study. The social identity theory was also chosen as the basis for analysis to investigate the research problem.

Background and Context

The literature review identified the need for inter-professional collaboration and communication as an emerging theme to strengthen collaborative health care practices and improve the quality of practice. Preparatory healthcare programs typically educate individuals in a segregated model. Ensuring safe and effective patient care require health disciplines to communicate in a collaborative setting. According to Smith [8], health care professionals needed to understand not only their own role but also the roles of the various health care providers working with them, regardless of their training, background, and current occupation in order to provide an environment conducive to a collaborative team approach to patient care. In addition, Smith [8] goes on to report that by providing interdisciplinary training centres these models will be representative of a more accurate healthcare setting in which healthcare team members would interact. In turn, the healthcare team may better understand their role within the group and have a better understanding of the communication skills needed to provide safe and effective patient care. Understanding the importance of collaborative interdisciplinary practice is critical, but can offer insight into the performance of both collaborative failures, as well as, successes across the nursing profession and other healthcare disciplines [9].

Interdisciplinary professional education remains the exception rather than the norm despite it becoming a prominent topic in nursing education. World Health Organization [1] reported that the highest rate of interdisciplinary training for any one specific discipline did not exceed 16%. The reported rate was inclusive of physicians, nurses, and physiotherapists [1]. World Health Organization [1] also reported the international rate for interdisciplinary professional education in other disciplines, such as speech-language pathologists, audiologists, community health workers, psychologists, physician's assistants, and nutritionists/dietitians did not exceed 5.7% in any one group. Freshwater et al. [9] recognized that the integration of collaborative practice in health care has not been fully implemented thus offering the question as why this concept has not become an educational standard for all healthcare disciplines including nursing.

Theoretical Framework

This study aligns with the social identity theory that was developed in 1979 by Tajfel and Turner. The characteristics of the social identity theory being of that of a person's sense of who they are was manifested by the group to which they belong. This study explored the perceptions of collaboration and communication that interdisciplinary training experience can have on all healthcare disciplines represented in the study in accordance with individual, group, and organizational affiliations. According to McNeil, et al. [10] initial lack of respect between the professions and stereotyping may have significant implication in collaboration and team management and trigger professional identity conflict. This study used the dynamics of simulation training with an interdisciplinary approach to improve patient outcomes through effective communication among members of the health care team. Although initially study participants may identify with their own group membership such as nursing, medicine, respiratory, and administration, each member of the team works toward adopting the identity of the newly formed collaborative group. Multiple disciplinary groups will learn how to adapt themselves to the values and behaviours of this newly formed interdisciplinary group and communicate effectively to assimilate an effective role in that group. This new role can have an insightful impact on being part of an interdisciplinary healthcare team [11].

There is a need to improve inter-professional communication among healthcare professionals. This development could improve respect for each other, improve clear and effective communication, and have an overall positive impact on patient outcomes. This study builds upon social identity theory through the incorporation of three categories of relevance: a) social, in which the individual decides which group they belong to; b) the individual recognizes their compatibility within their group; and c) social comparison, how an individual compares their group to another [10].

The future theoretical implications this study could have for nursing education may be to change in the way clinical situations are addressed as identified by the social identity theory. The social identity theory, being a social group identification process, relates to interaction between participants. This relationship may influence how collaboration is perceived. Therefore, tying this study to the social identity theory will help identify perceptions related to understanding interdisciplinary collaboration and possibly diminish the perceived obstacle to interdisciplinary collaboration and communication. Recognizing these perceptions will allow educational changes to reflect an understanding of the group dynamics in an interdisciplinary situation [12]. In addition, creating or enhancing interdisciplinary simulation training sessions utilized in preparatory nurse education programs has been anticipated as one of the practical outcomes of this study. Offering inter-professional team-based exercises may improve collaboration, break down barriers, and enhance performance among the newly formed interdisciplinary healthcare team [13]. This approach would allow for enhanced standardized care team centered scenarios, leading to increased understanding of each discipline's role without the authority of one's position interfering with this process.

Statement of the Problem

Coordination of care, collaboration, and communication among healthcare disciplines are paramount to the delivery of safe and effective patient care. The relative absence of effective collaboration and communication among interdisciplinary professionals can have a negative impact on teamwork and produce a detrimental patient outcome. A combination of challenges faces the future of the healthcare industry as the healthcare workforce continues to decline and patient complexity increases in the way of higher acuity levels, comorbidities, demographics and financial issues. The challenges leave each health care discipline the need to become more comfortable with collaboration. Historically, Copnell, et al. [14] reported on the perceptions of doctors and nurses related to interdisciplinary collaboration on two neonatal intensive care units found a lack of understanding between medical and nursing staff to have a negative impact on patient care. Therefore, the research problem identified is the impact that ineffective interdisciplinary collaboration and communication can have on patient outcomes.

Purpose of the Study

The purpose of the study is to compare the perceptions of collaboration and communication of individuals from various health care disciplines who have participated in an interdisciplinary training experience and individuals from various health care disciplines who have not participated in an interdisciplinary training experience in order to fill the gap in existing literature by adding evidence to increase awareness for the need of inter-professional education.

Research Questions and Hypotheses

RQ1

Is there a significant difference in the perception of inter-professional collaboration and communication for individuals from various healthcare disciplines who have participated in an interdisciplinary training experience and individuals from various healthcare disciplines who have not participated in an interdisciplinary training experience?

H₀

There is no significant difference in the perception of inter-professional collaboration and communication for individuals from various healthcare disciplines taking part in an interdisciplinary training experience and individuals from various healthcare disciplines who have not participated in an interdisciplinary training experience.

H₁

There is a significant difference in the perception of inter-professional collaboration and communication for individuals from various healthcare disciplines taking part in an interdisciplinary training experience and individuals from various healthcare disciplines who have not participated in an interdisciplinary training experience.

RQ2

Do demographic factors including sex, discipline, and years worked in that discipline have a significant influence on the perception of inter-professional collaboration and communication for individuals from various healthcare disciplines taking part in an interdisciplinary training experience and individuals from various healthcare disciplines who have not participated in an interdisciplinary training experience?

H₀

There is no significant difference in the perception of inter-professional collaboration and communication for individuals from various healthcare disciplines taking part in an interdisciplinary training experience and individuals from various healthcare disciplines who have not taken part in an interdisciplinary training experience due to demographics factors including sex, discipline, and years worked in that discipline.

H₂

There is a significant difference in the perception of inter-professional collaboration and communication for individuals from various healthcare disciplines taking part in an interdisciplinary training experience and individuals from various healthcare disciplines who have not taken part in an interdisciplinary training experience due to demographics factors including sex, discipline, and years worked in that discipline.

Rationale, Relevance, and Significance

This study is timely because it acknowledges a concern recognized by the American Association of Critical-Care Nurses [3], the American Hospital Associations [7], Joint Commission for Accreditation of Health Care Organizations [4], and the World Health Organization [1] with regard to the need for inter-professional collaboration. The potential value of these findings to practitioners in the discipline of nursing may influence nursing education by providing knowledge related to the perceptions interdisciplinary educational exercises can have on collaboration and communication. Researching the perception of inter-professional collaboration and communication for individuals from various health care disciplines who have participated in an interdisciplinary training experience and individuals from various health care disciplines who have not may have a significant impact on how interdisciplinary education is regarded as well as its overall impact on patient outcomes.

Rationale for the Study

This study has emerged from the relevant research, theory and knowledge in healthcare. The American Association of Critical-Care Nurses [3], the American Hospital Associations [7], Joint Commission for Accreditation of Health Care Organizations [4], and the World Health Organization [1] agree that interdisciplinary collaboration and communication are vital to producing positive patient outcomes. However, none of these organizations has stipulated how the members of these interdisciplinary health care teams perceive the push to collaborate with other disciplines. The knowledge generated from this study adds to the understanding of interdisciplinary collaboration and communication. Additionally, it adds to the research that already exists for the need to provide new learning strategies for interdisciplinary learning exercises in various health care programs such as in preparatory nursing programs.

Relevance of the Study

Billings and Halstead [2] specifically recognized the future of nursing education as needing to include interdisciplinary collaboration. This is relevant to nursing education. As professional partnerships increase between academia and health care organizations, the need to establish inter-professional collaboration is necessary to solidify the success of these partnerships as well as provide quality patient outcomes [15]. Health care organizations need to strengthen alliances among many different professional health care disciplines and improve on interdisciplinary collaboration to create a workforce that provides the best possible organizational and patient outcomes. The potential value of these findings could be instrumental in changing preparatory healthcare education by providing interdisciplinary collaboration and communication exercises that will prepare new graduates to be an effective healthcare team member.

Significance of the Study

According to Thibault [16] the healthcare profession will not be able to keep up with the aging population, chronic comorbidities, and advances made by technology and science in which is expediently growing to meet the needs of patients. Students and healthcare professionals alike learn to integrate evidence-based practice into the area of clinical expertise in which they are familiar. However, given the shift towards chronic and complex illness, collaboration across multi disciplines is needed to ensure high quality patient outcomes. The knowledge produced from this study will help to bridge the gap in literature from knowing there are positive patient outcomes with good interdisciplinary collaboration and communication to understating the perceptions of how those team members actually view training using interdisciplinary collaboration and communication. Thus, these perceptions will give educators an avenue of approach that will enable students to have a better understanding of other team members' perspectives.

Nature of the Study

The basic quantitative approach and methodology in this study is a descriptive comparative research study. The study compared the perception of inter-professional collaboration for individuals from various health care disciplines taking part in an interdisciplinary training program and those who do not. Participants may be nurses, physicians, security, dietary, and others from across the healthcare continuum. As a result, demographic data collected will include identification of specific healthcare discipline, gender, and years worked in that discipline. Ravid [17] suggested that a descriptive research study is preferable when there is no change in the routine of participants who are being studied and when there is no planned change in the environment scheduled. Utilizing a non-experimental survey as indicated by Creswell [18] provided numerical data describing the attitudes, or perceptions of the research sample as it stems from a specific population. The target of the data collected from the sample is that the results will be able to be generalized to that population [14]. A survey was conducted for those participants in the newly hired orientation class and for those participating immediately after an interdisciplinary simulation education opportunity has occurred using PINCOM-Q: Perception of Inter-Professional Collaboration Model Questionnaire [19]. Permission to use this questionnaire was obtained from the original author, Atle Ødegård.

The potential value of these findings to practitioners in the discipline of nursing may influence nursing education by providing knowledge related to the perceptions interdisciplinary educational exercises can have on collaboration and communication. Researching the perception of inter-professional collaboration and communication for individuals from various health care disciplines who have participated in an interdisciplinary training experience

and individuals from various healthcare disciplines who have not participated in an interdisciplinary training experience can have a significant impact on how interdisciplinary education is viewed and its overall impact on patient outcomes.

Definition of Terms

The following conceptual definitions, operational definitions and relationships between the variables are explained to aid the reader in understanding specific terms and distinctive meaning related to this study.

Interdisciplinary Collaboration

Interdisciplinary Collaboration is defined as interaction of team members across professions, and the concept of possible interactions across and between disciplines [20].

Communication

Communication is defined as “The act or process of using words, sounds, signs, or behaviours to express or exchange information or to express your ideas, thoughts, feelings, etc., to someone else” [21].

Discipline

Discipline is defined as “A body of persons engaged in the same profession, formed usually to control entry into the profession, maintain standards, and represent the profession in discussions with other bodies” [22].

Assumptions, Limitations, and Delimitations

There are certain presumptions associated with this research study that are believed as true or as confident to happen, without prior evidence of realization. In addition, circumstances that could not be controlled were viewed as study limitations thus potentially placing unforeseen constraints on the conclusion. However, characteristics that limited the latitude and defined the margins of this study were defined.

Assumptions

It was assumed that there would be an equal or adequate representation of each healthcare discipline surveyed in the orientation group as well as those participating in the simulation exercise experience. It was further assumed that the results of the perceptions of interdisciplinary collaboration and communication would yield vastly different results across the disciplines. In addition, there is an assumption that the results will encourage a dialogue between disciplines in order to better educate potential new graduates in all healthcare disciplines to collaborate and communicate in a team setting to facilitate positive patient outcomes. Lastly, it was assumed that the participants would be willing to answer the survey presented leading to an accurate portrayal of their perceptions.

Limitations

A limitation of this study is that participants may feel obligated to complete the survey because they will be in a controlled environment such as an orientation seminar or in a simulation, exercise, training class. A threat to internal validity may add to this limitation due to possible fatigue on the part of the participant after undergoing the simulation training. Another potential weakness of this study may include the process for selecting participants. There will be no way of knowing if the groups are equivalent at the beginning of the study. Although group selection is not a threat for the one group design, it may pose a threat for the two-group design.

Delimitations

The literature speaks for a call to action related to inter-professional education and collaborative practice, but does not indicate if other healthcare disciplines have even recognized this topic a valid concern that needed to be addressed. This study does not include research on this concern but rather focuses on the difference of perceptions related to interdisciplinary education.

Organization of the Remainder of the Study

Chapter 2 presents the theoretical framework for the study, and presents, analyses, synthesizes, and critiques the appropriate literature related to the problem described in Chapter 1. Chapter 3 describes the research methodology selected to respond to the problem and answer the research questions. Once the data collection and analysis are completed, Chapter 4 will present an analysis of the data. The completed dissertation concludes with Chapter 5, which includes a summary of the findings, the conclusions drawn from the data presented in Chapter 4, the implications for practice, the relationship of findings to the literature review, and the recommendations for practice and future research.

Literature Review

Introduction to the Literature Review

The purpose of this study is to look at the perceptions of collaboration and communication for individuals from various health care disciplines who have participated in an interdisciplinary training experience and those individuals from various healthcare disciplines who have not. Chapter 2 presents the theoretical framework for the study, a review of research regarding the perceptions of interdisciplinary collaboration and communication; a review of the methodological issues related to the study; a synthesis of the research findings; and a critique of the previous research presented. The themes and topics used to organize the literature review included: emerging themes related to interdisciplinary collaboration and communication in nursing education; interdisciplinary collaboration, and emerging trends

in healthcare education. The literature review also explores types of teaching-learning methodologies used for interdisciplinary training programs, and viewpoints and barriers to interdisciplinary collaboration.

In order to achieve a thorough and appropriate review many journal resources were accessed through the following databases: CINAHL Complete, Cochrane Library, Dissertations and Theses Global, Dissertations @ Capella, ERIC, EBSCOhost, Google Scholar, and ProQuest Medical Library. The terminology searched to locate the literature included interdisciplinary collaboration, inter-professional collaboration, perceptions of interdisciplinary and inter-professional collaboration, Perception of Inter-Professional Collaboration Model Questionnaire (PINCOM-Q), and social identity theory.

Theoretical Framework

The theoretical framework presents and defines the concept that explains why a research problem under study exists. The theoretical framework provides the foundation or basis for such research and was derived from existing theory. The theoretical framework selected for this research aligned with the problem, purpose, significance, research questions, methodology, and data analysis developed for this study.

Social Identity Theory

There were many theories considered before settling on one that would best fit the underpinnings of this study. The theoretical framework that can potentially explain the phenomenon under investigation is the social identity theory. The goal of this framework is to compare the perceptions of inter-professional collaboration and communication for individuals from various healthcare disciplines who have participated in an interdisciplinary training experience and individuals from various healthcare disciplines who have not participated in an interdisciplinary training experience. This study aligns with social identity theory developed by Tajfel and Turner by exploring the perceptions of interdisciplinary collaboration and communication of participants in the study. According to McNeil, et al. [10], initial lack of respect between the professions and stereotyping may have significant implication in collaboration and team management and trigger professional identify conflict. The theoretical basis for this study is social identity theory, developed by Tajfel and Turner in 1979. The social identity theory specifically relates to the field of nursing education because of the group dynamics with interdisciplinary team approaches to patient care in which nurses often work.

Characteristics of the Social Identity Theory

Tajfel and Turner [23] identified three variables whose contribution to the development of group favouritism is particularly important. The first, being the degree to which individuals identify

with a group and identify that group membership as an aspect of their self-concept. Next, the degree to which the dominant perspective provides ground for comparison between groups. Lastly, the perceived relevance of the comparison of the groups contributed to the development of group favouritism. That in itself was shaped by the individual's perception and absolute relevance in that group. Individuals are likely to display favouritism when a group is central to their own self-preservation and elicits a meaningful outcome.

Social identity theory asserts that group membership creates an in-group/self-categorization and enhancement in ways that favour the in-group at the expense of another group. The examples (minimal group studies) of Tajfel and Turner [23] showed that the mere act of individuals categorizing themselves as group members was sufficient to lead them to display divisional favouritism. After being categorized into a group membership, individuals seek to achieve positive self-esteem by positively differentiating their group from a comparison to another group on some valued dimension. This quest for positive distinctiveness means that peoples' sense of who they are is defined in terms of "We" rather than "I". This theory ties into this study because the perceptions of individuals in the orientation group who did not have a chance to participate in a simulation experience were compared to those who have participated in a simulation experience. Thus, those individuals participating in the simulation experience had the opportunity to examine the perceptions of who they are and why they do what they do and classify themselves and others as belonging to specific groups. The social identity theory aligns to how individuals perceive interdisciplinary collaboration in-group situations with members unlike themselves [24].

Impact of Inter-Professional Training

The impact of using inter-professional training for various healthcare disciplines may improve inter-professional collaboration and professional relationships among all health care disciplines in order to provide a collegial, supportive, high quality teamwork approach to patient care. A combination of challenges faces the future of nursing education as the healthcare workforce continues to decline and patient complexity increases in the way of higher acuity levels, comorbidities, demographics and financial issues [1,3]. These challenges leave nurses with the need to become more comfortable with collaboration with all members of the healthcare team including physicians, respiratory therapists, nursing assistances and pharmacists.

Implementing a common teaching-learning methodology across disciplines may be one way of breaking down barriers when it comes to delivering high quality health care with limited resources. This study's results should contribute to the underpinnings of social identity theory, developed by Tajfel and Turner in 1979, by supporting the concepts of how individuals align

themselves in groups and effectively communicate and collaborate as part of an interdisciplinary team. The practical implications that may result from this research study are improved communication between disciplines of medicine, nursing and ancillary health care professionals and increased use of interdisciplinary training among preparatory professional healthcare educators and schools of nursing. This research study will contribute to the social identity theory by using the PINCOM-Q: Perception of Inter-Professional Collaboration Model Questionnaire to evaluate the perceptions of individual, group and organizational aspects of inter-professional collaboration [19]. In addition, comparing the answers based on the characteristics described of sex, discipline and years worked in that discipline will enable the results to be inferred upon the larger population of each discipline represented within the study.

Review of Research Regarding the Perceptions of Interdisciplinary

Collaboration and Communication

This discussion includes a review of the research literature and the methodological literature. The literature suggested the recognition of the problem related to interdisciplinary collaboration and communication and suggest ways to improve it. The literature reviewed authenticates the problem and reinforces the need for an additional study.

Recognition of the Problem

According to the World Health Organization [1] the need for inter-professional collaboration and communication is a high priority in all health care professions due to the complexity of health care issues faced today and in the future. Buerhaus [25] recognized major health care issues of the future as the decline of the healthcare workforce. Particularly noted is the nursing profession, due to the aging population of nurses as well as threats related to the overall quality and accessibility to health care and the growing cost of health care. Buerhaus [25] quantified that within the next decade it will be necessary to implement a strategy to increase the number of nurses in the workforce as nurses' head toward retirement. It will be necessary to provide access to excellent and affordable health care while adequately preparing health care workers for the changing environment of health care organizations that are necessary to meet these challenges both locally and globally [25].

World Health Organization [1] performed an international environmental scan of inter-professional education practice from 42 countries. The results from these 42 countries found that inter-professional educational opportunities were taking place, but were not being systematically or equally distributed throughout various degree levels of education. As the World Health Organization provided the Framework for Action on Inter-Professional Education and Collaborative Practice, the focus was

that collaborative practice strengthens the health care system and improves the quality of practice [1,26]. Healthcare education and training programs need to prepare the next generation of healthcare professionals with interdisciplinary collaborative practice education to meet the global health concerns that face the future [27]. Inter-professional collaboration efforts in healthcare education across multi disciplines should be addressed.

Suggested Interdisciplinary Collaborative Education

Inter-professional collaborative practice is one of the driving forces guiding this research. Core competencies established by the Inter-Professional Collaborative Practice Panel were developed to encourage health care education to improve interdisciplinary collaborative practice [28]. Healthcare professionals are often taught within their own discipline. It is not until real world events place professionals in an interdisciplinary setting that collaboration is understood as vital for successful patient outcomes [26]. Evaluating the individual perceptions of an interdisciplinary educational opportunity is necessary to substantiate change needed in education across various healthcare disciplines [28]. The literature suggests the need to improve interdisciplinary collaboration across healthcare disciplines in order to improve patient outcomes [1,7,8]. Using simulation as a means to foster this collaborative effort has been addressed as a joint responsibility for improving the interdisciplinary relationship [29]. How these research participants perceive collaboration and communication both after receiving an interdisciplinary training exercise and for those who have not received an interdisciplinary training exercise can have an overall impact on healthcare educational practices in the future.

Need to Strengthen Interdisciplinary Communication Efforts

In 2007, the Joint Commission recognized that there were only an 84.3% compliance rates which improved the effectiveness of communication among caregivers. This report identified performance trends, and the top standard compliance issues on how Americas accredited hospitals performed. The results of this report identified imminent opportunities for development and improvement in this category. One of the most common causes of negative patient care outcomes was deemed to be communication [4]. The World Health Organization [1] suggested implementing inter-professional education and collaborative practice to strengthen the health care system, provide optimal health services and ultimately improve patient outcomes. Hean, et al. [30] determined that attitude and perceptions are a function of behaviour and play an important role in what individual members of the groups think they should say or do. A recent study conducted by Lancaster, et al. [31] focused on individual skill and perspectives of physicians, nurse, and unlicensed personal. The study concluded that healthcare providers from these various disciplines barely communicated with each other. Lancaster, et al.

[31] also indicated that a hierarchical and subservient relationship existed within the various healthcare disciplines represented. Effective collaboration and communication are necessary between healthcare professionals since care for a single patient is often fragmented between disciplines. Therefore, it is essential to develop educational programs that include interdisciplinary collaboration and communication at a preparatory level to ensure the best outcome for the future of patient care.

There is a multitude of literature to support the overwhelming positive impact on patient outcomes because of improved collaboration and communication among various healthcare disciplines [32]. Overall, several studies found that individual attitudes influenced interdisciplinary collaboration and communication efforts amongst the participants. All of these studies represented were limited to physician and nurse interaction [33-35]. Each of these fore mentioned studies represented were limited to physician and nurse interaction.

A continued review of the literature found research related to the perceptions of interdisciplinary collaboration and communication in healthcare was limited. Initially the perspectives of collaboration and communication were recognized in a study measuring the quality of inter-professional collaboration in child mental health. This study examined the collaborative decision-making perceptions and behaviours among inter-professional collaborators and evaluated the quality of partnership as a predictor of mental health outcomes. The preliminarily resulted in the increased value of developing perceptions of interdisciplinary associations and ease of decision making [36]. In addition, students' perceptions of inter-professional education were studied by Cusack, et al. [37] who determined that students valued the opportunity to work with other healthcare disciplines. Both of these studies speak to the impact interdisciplinary collaboration can have on healthcare workers.

Physicians' perceptions of interdisciplinary collaboration in training hospitals were studied by Minamizono, et al. [38]. It was there it was determined that physicians in this study had a negative perception of inter-professional collaboration. In addition, graduate perceptions of working in a healthcare team focused on the concept of knowing about the roles and responsibilities of working in a collaborative relationship [39]. Ebert et al. [39] results showed that many nurses, pharmacy, and medical graduates who participated in their study could see better interdisciplinary collaboration if prepared at an undergraduate level. Evaluation of these studies showed a need to expand on the groundwork laid in researching the perceptions of interdisciplinary collaboration and communication across healthcare disciplines.

Delunas, et al. [40] analysed attitudes of nurses and physicians regarding collaboration and communication. The attitudes towards interdisciplinary collaboration and communication both before and

after an interdisciplinary educational experience were compared in the study. The medical students beginning their education had less of a positive attitude towards interdisciplinary collaboration and communication than the nurses did. However, all of the students rated interdisciplinary collaboration and communication as less than ideal prior to the project. Students in this study also indicated that they did not have any introduction as to what the other disciplines' roles were [40].

Expanding inter-professional education across healthcare disciplines. Further exploration is needed to bridge the gap to enhance the use if simulation in interdisciplinary education. Robertson et al. [41] highlighted that healthcare professionals from all disciplines need to learn about and from each other so they can provide a collaborative teamwork approach to patient centered care. It was believed that simulation education needed to include other allied health professionals besides physicians and nurses. Verbalizing a shift from the traditional healthcare discipline model of education to that of interdisciplinary education using simulation was noted as one of the most anticipated challenges in the future of healthcare education [42].

Although educated in a single discipline model, Reese, et al. [43] indicated both medical and nursing students' perceptions of collaborative simulation were positive. Investigating the use of simulation as an interdisciplinary teaching strategy, Reese et al. [43] found both nursing and medical students were satisfied, well-choreographed simulation exercises improved interdisciplinary communication, and could ultimately affect patient care. Some of the students in this study indicated it was the first time they had worked with another discipline. The majority of these students also reported that collaboration between the disciplines helped them experience real life situations and how collaborating facilitated the best outcome for the patient [43].

Titzer, et al. [44] supported the American Hospital Association (AHA) Physician Leadership Forum [7] report for a need for a high-quality team approach to interdisciplinary educational training programs. Interdisciplinary simulation was seen as an effective teaching strategy to problem solving among student healthcare professions. The students' perceptions of an interdisciplinary simulation exercise reinforced the need to understand other healthcare discipline roles in frequently encountered patient situations. This study provided a viewpoint from the students that the roles of each discipline in the simulation exercise were different from what their general assumptions of that discipline were before the exercise took place [7]. Thus, Titzer, et al. [44] study reinforced the need to implement interdisciplinary educational opportunities in all healthcare professions.

Obtaining a positive perception to using inter-professional education to foster better communication among multi health care disciplines does not come without barriers. Some of the

barriers that may have an impact on interdisciplinary educational practices of the future was noted by Beaulieu [45] was fragmented interdisciplinary communication opportunities. In addition, limited compatible technological capabilities between multidisciplinary groups were noted. These obstacles suggest that the feasibility of formulating positive inter-professional collaboration efforts may be too costly to include based on organizational and program resources. Michalec, et al. [46] noted another barrier to inter-professional collaboration and communication that developed, which was an individual's perception of their profession. Michalec, et al. [46] also suggested that preconceived occupational stereotypes could be daunting barriers to conveying the standards of a team approach to patient care based on results from a study they performed of first year, health profession, students at Northeastern University. Individuals in this study rated their own profession the highest in academic ability, practical skills, confidence, professional competency, interpersonal abilities, leadership skills, ability to work autonomously and as a team player, along with the ability to make decisions. These results provided clear evidence that these preconceived attitudes could have a negative impact on the perception of inter-professional collaboration and communication on the future of health care [46].

Past experiences affecting results. Several limitations to study results were realized while performing this literature review. A few of the studies were small, having less than 75 participants, thus possibly not being able to be generalized to the overall population [40,43]. There was also a likelihood that the medical students who participated in the study, which had included a simulation exercise, worked frequently together in their studies [40]. Providing an accurate representation of the number of participants and their past experiences is important in determining the impact that Interdisciplinary collaborative training can have in the future of healthcare education. In addition, a limitation affecting the positive results in regards to the use of well-choreographed simulation to improve interdisciplinary communication between nurse and physicians was noted. Finan, et al. [47] realized that failure to take into account if any of the students had prior exposure to simulation training along with their prior clinical experience and previous exposure to simulation training affected their ability to transfer improved performance to the clinical setting. Titzer, et al. [44] also missed the mark by inadequately taking in to account the different levels of education of the students that participated in that study. In addition, they did not take into account that those students with more clinical experience would have perceived the simulation exercises as a more valuable educational opportunity above those with less clinical experience.

Review of Methodological Issues

The various designs used to research this topic have been both qualitative and quantitative. Mueller et al. [48] used a qualitative approach to explore needs and problems in inter-professional

collaboration in interviews with nursing home residents and their relatives. This study resulted problems and barriers concerning inter-professional communication and collaboration in nursing homes from the viewpoint of all the participants. MacNaughton, et al. [49] needed to clearly define structural and interpersonal influences in another qualitative study in order to make research assumptions and to provide precise information about the methods and data analysis. The choice of using a quantitative study was based off of the means needed to investigate theory by scrutinizing the relationship among variables. In turn, results can be analysed using statistical procedures [50].

A review of other studies using such methodology aligned with this study. Those in particular, related to the perceptions of interdisciplinary collaboration in the mental health care of children and collaborative perceptions in a sample of individuals working within a community of crime prevention enterprises [19,51]. Thus, the choice to use a quantitative design was supported by use of the PINCOM-Q: Perception of Inter-Professional Collaboration Model Questionnaire used in these studies [19]. Therefore, the use of a qualitative study was not feasible in order to make descriptive comparisons of individuals and groups surveyed.

Critique and Synthesis of Research Findings

Overall, the research findings had an underlying commonality of a consensus that interdisciplinary collaboration and communication is essential to producing positive patient outcomes [3,4,7]. However, the literature failed to show how various healthcare disciplines have embraced this concept into their educational practice models or even just what they perceived as the actual collaboration and communication process [1,46]. In relationship to the social identity theory, there is a clear, significant difference in the perception of collaboration and communication for individuals taking part in an interdisciplinary collaborative effort based on their self-identity to members of a specific like group [24]. The Inter-Professional Collaborative Educational Expert Panel [28] suggested that assessing the perceptions of individuals related to an interdisciplinary collaboration and communication is necessary to substantiate change needed in education across various healthcare disciplines.

The literature reviewed portrayed a significant problem with inter-professional collaboration and communication. Hence, lack of interdisciplinary collaboration and communication ultimately having a negative impact on patient outcomes. The research showed an inconsistency in instructive approaches to interdisciplinary education across various healthcare disciplines and nowhere did the literature realize the participants' perceptions of this topic. Therefore, there was a need for this study to determine what the perceptions of interdisciplinary collaboration are in order to proceed with further research on best educational practices needed to improve inter-professional collaboration.

Summary

The body of literature reviewed uncovered a common theme of the importance of interdisciplinary collaboration and communication in healthcare professions. The majority of the literature focused on recognizing not only the need for interdisciplinary collaboration and communication but also that using interdisciplinary simulation exercises were a reassuring way to overcome this obstacle. Although these findings saturated the body of literature reviewed, the literature failed to recognize or take into account the actual perceptions of healthcare professionals with respect to their perception of interdisciplinary collaboration and communication. Careful consideration must be made with respect to the perceptions of healthcare professionals' perception of interdisciplinary collaboration and communication if a change in educational models is to occur in response to this need. Understanding individual perceptions and as related to the social identity theory will help educators in all healthcare disciplines formulate a plan for curriculum reform.

Methodology

Introduction

The research question for this study: Is there a significant difference in the perception of inter-professional collaboration and communication for individuals from various healthcare disciplines who have participated in an interdisciplinary training experience and individuals from various healthcare disciplines who have not participated in an interdisciplinary training experience? This study based its design on Creswell [50], who described quantitative research as a way to collect numerical data, perform statistical analysis, describe, and explain behaviours which constitute reality. The basic quantitative approach and methodology used in this study was a descriptive comparative research design. The study compared the perception of inter-professional collaboration for individuals from various healthcare disciplines taking part in an interdisciplinary training program with those who have not participated in an interdisciplinary training exercise.

Purpose of the Study

The purpose of the study is to compare the perceptions of collaboration and communication of individuals from various healthcare disciplines who have participated in an interdisciplinary training experience and individuals from various health care disciplines who have not participated in an interdisciplinary training experience in order to fill the gap in existing literature by adding evidence to increase awareness for the need of inter-professional education.

Research Questions and Hypotheses

RQ1

Is there a significant difference in the perception of inter-professional collaboration and communication for individuals from various healthcare disciplines who have participated in an interdisciplinary training experience and individuals from various healthcare disciplines who have not participated in an interdisciplinary training experience?

H_0

There is no significant difference in the perception of inter-professional collaboration and communication for individuals from various healthcare disciplines taking part in an interdisciplinary training experience and individuals from various healthcare disciplines who have not participated in an interdisciplinary training experience.

H_1

There is a significant difference in the perception of inter-professional collaboration and communication for individuals from various healthcare disciplines taking part in an interdisciplinary training experience and individuals from various healthcare disciplines who have not participated in an interdisciplinary training experience

RQ2

Do demographic factors including sex, discipline, and years worked in that discipline have a significant influence on the perception of inter-professional collaboration and communication for individuals from various healthcare disciplines taking part in an interdisciplinary training experience and individuals from various healthcare disciplines who have not and participated in an interdisciplinary training experience?

H_0

There is no significant difference in the perception of inter-professional collaboration and communication for individuals from various healthcare disciplines taking part in an interdisciplinary training experience and individuals from various healthcare disciplines who have not taken part in an interdisciplinary training experience due to demographics factors including sex, discipline, and years worked in that discipline.

Research Design

The methodology used for this research study was a quantitative study design. This study based its design on Creswell [50] who described quantitative research as a way to collect

numerical data, perform statistical analysis, describe, and explain behaviours to constitute reality. The basic quantitative approach and methodology used in this study is a descriptive comparative research study. The study compared the perception of inter-professional collaboration for individuals from various health care disciplines taking part in an interdisciplinary training program with those who have not participated in an interdisciplinary training exercise. The nature of the research problem determined how the research and questions were best shaped, thus driving the choice for the type of research design and survey tool to be used. Participants were physicians, nurses, phlebotomists, nursing assistants, and others from across the healthcare continuum. As a result, demographic data collected included identification of specific health care discipline, sex, and years worked in that discipline.

This research study was based on the theoretical framework developed by Tajfel and Turner in 1979 related to the social identity theory. The social identity theory supports the insight of individuals who collaborate with professionals from other services with respect to individual, group, and organizational aspects of team communication, thus serving as the foundation to identify if there is a significant difference in the perception of inter-professional collaboration for individuals taking part in an interdisciplinary training program and those who do not take part in an interdisciplinary training program [24]. A quantitative study affirms the results in concrete numbers, thus making it applicable to use statistical tests in order to make statements about the data obtained. Statistical analysis allows for development of important facts from research data, including similarities and differences in demographic data and between groups. These include descriptive statistics such as the mean, median, and standard deviation, but can also include inferential statistics including the independent sample t-tests [18].

Historically, social sciences have used a quantitative approach to reduce information to numbers so that the information could be more easily understood. The quantitative method of research design was the best fit for this research problem because it allowed a highly formalized approach to data collection using scales. In turn, this allows generalizations to the whole population to be made. It also allowed for testing the theory including the hypothesis by recognizing relationships among the characteristics resulted. This was particularly important because of the comparison of data between the orientation group and the simulation group regarding their perceptions of interdisciplinary collaboration and communication [52].

Target Population, Sampling Method, and Related Procedures

Nurse educators must learn, develop, and promote new teaching strategies related to interprofessional collaboration and

communication. The participants of this study were chosen on a voluntary participation status. They were eligible to participate in the study if they met the inclusion criteria of being members of a healthcare discipline and being over 18 years of age. Recruitment of the study participants involved surveying enough people in orientation classes along with an equal number of people participating in a simulation experience to ensure a 95% confidence level and a 5% margin of error [53]. The recruitment was accomplished by means of convenience sampling.

Target Population

The population at large, from which this study's sample drew was healthcare disciplines. The sample of healthcare individuals represented in this study was from multiple disciplines such as medicine, nursing, and other health services such as respiratory, echo-physics, rehabilitation and other discipline forte across the healthcare system. The group of participants represents typical cases in which they have similar characteristics demonstrative of others in the group. The identifiable characteristics that make this target population unique from other populations are that the participants from both the orientation group and the simulation group are all members of a healthcare discipline. They provide the study greater value because they represent a narrowly defined representation of the population and provide an opportunity to study a specific issue [54].

Sampling Method

This research study used a convenience sampling strategy. According to Ravid [17] a convenience sampling strategy allows for easy access to participants, is relatively cost effective, and less time consuming than other sampling methods used in research. There was no extra cost to the participants or to the institution to conduct this research. In addition, this setting was appropriate for the study because the individual participants were already present at the facility for either an orientation session or the simulation training when asked to participate, therefore allowing for convenience sampling to take place.

Sample Size

Roughly, 25 individuals participate in the simulation training on any scheduled day, with classes totalling approximately 60 each month throughout the system. Specifically, the individual medical center holds several classes per month. In addition, this facility conducts orientation classes for new employees on a regular basis that does not include an interdisciplinary training exercise. The data was collected over a two-month period. The method for determining the size of the study was adjusted to the total number of participants needed for a 95% confidence level and a 5% margin of error. Based on 100 possible participants a sample size of 80 was required [53]. The justification for using these calculation parameters was also decided on what would be a valid result as

opposed to running the risk of being wrong. In other words, there is a one in 20 chance of being wrong at 5%, therefore there is a 95% chance of being right [55]. The smaller subset results can be inferred upon the larger population of each discipline represented within the study [18].

Setting

The study took place at a New Jersey hospital. Participants in a new orientation classroom and in its clinical simulation lab were surveyed. The setting was then selected for precise reasons illustrative of the research problem. In other words, the project was supported in a natural setting by conducting an anonymous survey to learn about the perspectives of interdisciplinary collaboration and communication.

Recruitment

Recruitment of participants included new employees at a hospital in New Jersey who were attending an orientation class. The researcher received information in advance regarding the orientation dates along with the number of employees who would gather in sessions from the human resources department of the hospital. Potential participants from several orientation classes attended by newly hired staff from a variety of health care disciplines were recruited. Participants from both the intervention group and new hire group were also recruited after instructors for the interdisciplinary training sessions were contacted and received an explanation of purpose of study, researcher's role, and survey procedures for each class. It was advised persons were under no obligation to participate and there would be no penalty for not participating in. Subsequently, an invitation to participate was offered and any questions the participants had were answered. It was explained that participation was voluntary and identities would remain completely anonymous. Implied consent was given through completion of the survey.

Instrumentation

The survey instrument used was Ødegård's [19] PINCOM-Q: Perception of Inter-professional Collaboration Model Questionnaire a 48-item, 7-point Likert scale instrument. The survey instrument (Appendix A) is broken down into twelve (C1- C12) subdivisions of participants' perceptions which are "motivation, role expectations, personality style, professional power, group leadership, communication, coping, social support, organizational culture, organizational aims, organizational domain, and organizational environment" [56]. Each of these topics is broken down further into three separate categories: individual, group, and organizational aspects related to the activity. Permission to use this tool was obtained from the originator, Dr. Atle Ødegård.

The reliability of the PINCOM-Q: Perception of Interprofessional Collaboration Model Questionnaire was tested

prior to its use in the research related to the perceptions of interdisciplinary collaboration in the mental health care of children [19]. The tool initially yielded 0.87 when reliability was presented as a 22-item questionnaire. When the item count was increased to 48, the reliability increased to 0.91 thus, substantiating the reliability of the PINCOM-Q: Perception of Interprofessional Collaboration Model Questionnaire validity was not determined by the use of one item but by the relationship between all of the test items and the perceptions of what it was supposed to measure [19]. Validity was legitimized because the items measured interdisciplinary perceptions as it anticipated and the scores had a purpose in determining the usefulness of interdisciplinary collaboration and communication efforts in the mental health of children [19,51]. The independent variable is the interdisciplinary training experience. In this study, the session was a practice and training session for a real-life, patient care, event. The dependent variable is the perception of interprofessional collaboration of the individual participants. The survey tool was a self-administered instrument completed by each participant after participation in the interdisciplinary training exercise and for those who did not receive the interdisciplinary training session.

Data Collection

A survey was appropriate for this study because surveys were able to provide quantitative results related to perceptions or opinions of the sample being surveyed. This type of data was collected in a relatively short period of time as well as being cost effective and convenient [18]. The actual collection of the data was completed over a six-week period in March and April 2016. These days included different times of day, different days of the week and included 100 participants representing many different professional healthcare disciplines. The twenty different healthcare disciplines were actually represented in this study were; pharmacy, nursing (registered nurses), nursing (certified nursing assistants), surgery, dietary, environmental services, clerical, administration, polysomnography, medicine (physician assistant), patient transportation, security, rehabilitation, phlebotomy, psychiatric screening services, medicine (physicians), multi-care patient technology, cardiac services, and respiratory.

The same procedural steps to collect the research data in the orientation classes, as well as the simulation exercise sessions were executed. The research study introduction, purpose of the study, and procedure of survey, as well as the anonymity and implied consent were also explained to each class. Once the explanation of the study was given, the principle investigator left the room, the surveys were given out, completed, and returned in sealed plain white envelopes to a larger collection envelope. Upon collection of all surveys, the collection envelope was sealed, and given to the principle investigator by the classroom instructor. The collected data was then coded and manually transferred into IBM SPSS

version 22 for statistical analysis.

Operationalization of Variables

The independent variable in this study is the interdisciplinary training exercise and the dependent variable is the perception of the participants related to interdisciplinary collaboration and communication. The independent variable cannot be measured because it is defined as a standardized educational experience, which cannot be changed. The level of measurement for the dependent variable was measured using an interval scale by which the difference in survey results can be measured with absolute certainty and there is no ambiguity within the measurement. The survey tool PINCOM-Q: Perception of Inter-Professional Collaboration Model Questionnaire uses 7-point Likert scale to achieve that goal. The 7-point Likert scale ranged from 7 = strongly disagree to 1 strongly agree. The survey tool PINCOM-Q: Perception of Inter-Professional Collaboration Model Questionnaire was also separated into 3 separate categories of questions using the same 7-point Likert scale. Individual aspects ranged from question 1-25, group aspects ranged from questions 26-37, while organizational aspects completed the survey with questions 38-48.

Data Analysis Procedures

IBM SPSS version 22 for statistical analysis was used to prepare the data for analysis. It was necessary to code the data creating two separate groups of participants for comparison, hence being the orientation group and simulation group.

RQ1

Is there a significant difference in the perception of interprofessional collaboration and communication for individuals from various healthcare disciplines who have participated in an interdisciplinary training experience and individuals from various healthcare disciplines who have not participated in an interdisciplinary training experience?

H_0

There is no significant difference in the perception of interprofessional collaboration and communication for individuals from various healthcare disciplines taking part in an interdisciplinary training experience and individuals from various healthcare disciplines who have not participated in an interdisciplinary training experience.

H_1

There is a significant difference in the perception of interprofessional collaboration and communication for individuals from various healthcare disciplines taking part in an interdisciplinary training experience and individuals from various healthcare disciplines that have not participated in an interdisciplinary training experience.

Additional coding was required to prepare the data for the demographic characteristic comparison between the orientation group and the simulation group. This included gender, discipline, and years worked in that discipline. Sex was coded as 1 = male and 2 = female. Each discipline was then coded with a number ranging from 1-20 indicating the specific disciplines representative of the participants in the study which is represented in (Table 1). Lastly, the number of years in which each individual worked in his or her respective discipline was entered into IBM SPSS version 22 as detailed by the participant.

Code	Discipline
1	Pharmacy
2	Nursing (Registered)
3	Nursing (Certified Nurse's Aide)
4	Surgery
5	Dietary
6	Environmental Services
7	Echophysics
8	Clerical
9	Administration
10	Polysomnography
11	Medicine (Physician Assistant)
12	Patient Transportation
13	Security
14	Rehabilitation
15	Phlebotomy
16	Psychiatric Screening Services
17	Medicine (Physician)
18	Multi-Care Patient Technology
19	Cardiac Services
20	Respiratory

Table 1: Discipline Data Coding.

RQ2

Do demographic factors including sex, discipline, and years worked in that discipline has a significant influence on the perception of interprofessional collaboration and communication for individuals from various healthcare disciplines taking part in an interdisciplinary training experience and individuals from various healthcare disciplines that have not participated in an interdisciplinary training experience?

H_0

There is no significant difference in the perception of interprofessional collaboration and communication for individuals from various healthcare disciplines taking part in an interdisciplinary training experience and individuals from various healthcare disciplines who have not taken part in an interdisciplinary training experience due to demographic factors including sex, discipline, and years worked in that discipline.

Types of data analysed was each group individual participants scores a specific set of questions were divided into the three categories; individual, group, and organizational perceptions to collaboration and communication within an interdisciplinary setting and for those not included in the training session. In addition, comparing answers based on sex, discipline and years worked in that discipline was analysed. To answer the second research question, statistics measured the central tendency; mean, median, and mode, measures of variability around the mean, measures of deviation from normality, measures for size of the distribution and measures of standard error [57]. An independent samples t-test was executed to make a comparison of the two groups of individual participants, those who received the interdisciplinary training exercise and those who did not. The significance of evaluating the three separate categories of individual, group, and the organizational aspects of collaboration with professionals from other disciplines is to see if the perception of interdisciplinary collaboration is greater in one section such as individually, in a group, or organizationally over another was conducted. In addition, each discipline represented in the survey was compared, as well as comparing the perceptions of those receiving the interdisciplinary training exercise with those who did not.

The independent variable in this study is the interdisciplinary training exercise and the dependent variable is the perception of the participants related to interdisciplinary collaboration and communication. The independent variable cannot be measured because it is defined as a standardized educational experience which cannot be changed. The level of measurement for the dependent variable will be measured using an interval scale by which the difference in survey results can be measured with absolute certainty and there is no ambiguity within the measurement. The survey tool PINCOM-Q: Perception of Inter-Professional Collaboration Model Questionnaire uses 7-point Likert scale to achieve that goal.

Limitations of the Research Design

Atieno [58] referred to quantitative research as looking only at a glimpse reality, which cannot be divided or combined without losing the meaning of the whole occurrence. Limitations of a research design, sampling technique, sample size, or instrumentation are weaknesses that could not be controlled that place limitations on the research methodology and conclusions. Specific limitations on the study population may eventually affect what results were obtained. Unforeseeable limitations of this study included that participants may not have been forthcoming in answering the survey questions honestly. In addition, time constraints to fill out the survey may have been perceived by the participant causing them to feel rushed to answer the survey [59]. A limitation that could have an impact on the overall conclusion of the results may be attributed to not including a specific question on the descriptive survey page. The question regrettably omitted from the descriptive

page of the survey would have asked if any of the participants had partaken in a simulation exercise prior to taking the survey. The answer to that question could have affected the results of this study when comparing the orientation group and the simulation group. Lastly, another question overlooked relates to certain disciplines possibly having a multifaceted degree or specialty associated with it, which could have also, affect the results obtained.

Internal Validity

Internal validity allows one to draw an accurate conclusion based on the research design. In other words, was the research done right? Even though it is impossible to account for every variation, the limitations and recognition of possible threats to internal validity are well represented. PINCOM Q: Perception of Inter-Professional Collaboration Model Questionnaire documents the perceptions of the participants related to collaboration and communication. It is composed of three dimensions assessing individual, group and organizational collaborations. Reliability was reflected in the accuracy of the study's instrument. In this study, the survey tool was designed to elicit responses directly related to the research phenomenon in question [36]. Participants were also not able to change their behaviour knowing they were part of a study. This was due to fact that they were not asked to participate until after the simulation exercise was completed.

However, internal validity was threatened in the orientation group because there was no data collected as to whether or not the participants had participated in any type of simulation exercise in any other capacity or in their past experiences related to their discipline and years worked. Another possible threat to internal validity could come from within the simulation group not being asked if the specific simulation exercise completed was the contributing factor in their perception of interdisciplinary collaboration and communication. Even without these two validations, the data results will lead to an accurate conclusion in answering the research question regarding the perceptions of interdisciplinary collaboration and communication and other relationships in the study.

External Validity

External validity refers to how well these results can be generalized to a larger population [50]. In this research study, threats to external validity were kept to a minimum. The interaction of selection and treatment was consistent with groups of healthcare professionals' having similar characteristics. The interaction of setting and treatment was a minimal threat to external validity because several different simulation exercises were performed on different days prior to data collection. In addition, the simulation settings were conducted in different physical locations. In addition, the interaction of history and treatment was also a minimal threat to external validity of this study because the simulation exercises

were performed at different times of the day and on different days of the week through the six weeks of data collection [18].

Expected Findings

The literature provides evidence of supporting the need for inter-professional educational training in healthcare disciplines [1,3,4,7]. The expected findings of this research study were that there would be a significant difference in the perception of inter-professional collaboration and communication for individuals taking part in an interdisciplinary training program with those who do not. It would also be anticipated that there will be a significant difference in the perception of inter-professional collaboration for individuals taking part in an interdisciplinary training program due to demographics factors including gender, discipline, and years worked in that discipline. It is predicted that there will be a significant statistical difference between the orientation group and the simulation group at the $p = <.05$ level.

Ethical Issues

Conflict of interest statement. At the time of the study there was a professional affiliation with the healthcare industry for the past 24 years. More importantly, the researcher has taken a personal interest in the topic of providing adequate education for student nurses, as well as newly licensed registered nurse for the past 13 years. As both a licensed, practicing, registered nurse and a professor of nursing education, the research has seen the need to integrate interprofessional collaboration and communication experiences in order to foster a better understanding of professional roles and responsibilities within the healthcare setting that will ultimately lead to better patient outcomes. There was no financial interest related to this research study. Although the researcher had worked for the hospital system, specifically for the last 19 years at the hospital in which the research was conducted, the researcher ensures there was no compromise to the objectivity with which the research was designed, conducted, and reported. Researchers position statement. There is a commitment to finding new learning opportunities as a nurse educator. As the need for interdisciplinary collaboration and communication grows exponentially in the healthcare field, so must the education for nurses to effectively collaborate and communicate in those settings [1,3,4,7]. Evaluating the perceptions of interdisciplinary collaboration and communication through this research study will enable healthcare educators to better formulate effective teaching strategies involving other healthcare disciplines.

It is this research's position that healthcare disciplines need education on the foundational basis for effective interdisciplinary collaboration and communication as demonstrated by the literature [1,3,4,7]. The PINCOM-Q: Perception of Inter-Professional Collaboration Model Questionnaire used in this research study was a quantitative way to accurately collect and measure the

data. It yielded a non-bias approach because the questions were standardized with no opinion interjected into the wording questions. A clear explanation of the research study, as approved by both the Capella University internal review board and the facilities institutional review board given before consent was obtained, eliminated any bias or potential conflict of interest that may have been in question. Approval was obtained from the Internal Review Board at Capella University along with the institutions Internal Review Board, prior to the start of the research to ensure the safety of all participants entered into this study. All study participants were guaranteed protection from harm. The participants were advised that there was no risk or benefit to them to participate in the study and that doing so was strictly on a volunteer basis. In addition, the participants were guaranteed the right to anonymity, and ensured confidentiality. Participants were given an explanation of the study and advised by completing the survey was giving their implied consent to be a part of the study. There were no vulnerable populations subjected to this study.

Summary

The purpose of the study was to look at the perceptions of collaboration and communication for individuals from various healthcare disciplines who have participated in an interdisciplinary training experience and those individuals from various healthcare disciplines who have not. The nature of the research problem determined how the research and questions were best shaped and therefore a quantitative design was chosen. The social identity theory developed by Tajfel and Turner in 1979 supported the insight of individuals who collaborate with professionals from other services with respect to individual, group and organizational aspects of team communication and was an obvious choice to be the theoretical framework of this study. The appropriate target population and sample size yielded a 95% confidence level. In addition, the researcher chose the precise survey tool, PINCOM-Q: Perception of Inter-Professional Collaboration Model Questionnaire, to measure the desired responses. The chapter also provided an overview of the recruitment and data collection process as well as the data analysis procedures. Study limitations are discussed along with any conflict of interest and ethical issues that may have arisen. Lastly, this position statement was well-articulated and defends the rationale for this study related to the need for interdisciplinary education in healthcare.

Data Analysis and Results

Introduction

The purpose of this chapter is to present the results of this quantitative study conducted using descriptive comparative research. The purpose of this study was to compare the perceptions of collaboration and communication of individuals from various health care disciplines who have participated in an interdisciplinary

training experience and individuals from various healthcare disciplines who have not participated in an interdisciplinary training experience. The research question investigated was, "Is there a significant difference in the perception of interprofessional collaboration and communication for individuals from various healthcare disciplines who have participated in an interdisciplinary training experience and individuals from various healthcare disciplines who have not participated in an interdisciplinary training experience?" The hypotheses generated pertaining to this question were

H₀

There is no significant difference in the perception of interprofessional collaboration and communication for individuals from various healthcare disciplines taking part in an interdisciplinary training experience and individuals from various healthcare disciplines who have not participated in an interdisciplinary training experience.

H₁

There is a significant difference in the perception of interprofessional collaboration and communication for individuals from various healthcare disciplines taking part in an interdisciplinary training experience and individuals from various healthcare disciplines who have not participated in an interdisciplinary training experience

In addition to the primary data being collected with the PINCOM-Q: Perception of Inter-professional Collaboration Model Questionnaire survey, a demographic survey was also used to collect data [19]. This led to the formulation of the secondary research question, "Do demographic factors including sex, discipline, and years worked in that discipline have a significant influence on the perception of interprofessional collaboration and communication for individuals from various healthcare disciplines taking part in an interdisciplinary training experience and individuals from various healthcare disciplines who have not participated in an interdisciplinary training experience?" Consequently, the following additional hypotheses were produced:

H₀

There is no significant difference in the perception of interprofessional collaboration and communication for individuals from various healthcare disciplines taking part in an interdisciplinary training experience and individuals from various healthcare disciplines who have not participated in an interdisciplinary training experience due to demographics factors including sex, discipline, and years worked in that discipline.

H₂

There is a significant difference in the perception of interprofessional collaboration and communication for individuals from various

healthcare disciplines taking part in an interdisciplinary training experience and individuals from various healthcare disciplines who have not taken part in an interdisciplinary training experience due to demographics factors including gender, discipline, and years worked in that discipline. This chapter also includes a description of the sample, summary of the results and a detailed analysis of such.

Description of the Sample

The sample of healthcare individuals represented within this study came from many disciplines such as pharmacy, nursing (registered nurses), nursing (certified nursing assistants), surgery, dietary, environmental services, clerical, administration, polysomnography, medicine (physician assistant), patient transportation, security, rehabilitation, phlebotomy, psychiatric screening services, medicine (physicians), multi-care patient technology, cardiac services, and respiratory. The participants volunteered from two distinct types of classes offered by the healthcare system. Initially, participants were asked to volunteer after taking part in an educational simulation exercise. In addition, this facility conducted several orientation classes for new employees, representative of many interdisciplinary groups. These groups of participants were asked to volunteer for the research study prior to any interaction with the class officials. The participants from the orientation classes did not partake in any interdisciplinary training exercise as part of this class. This research study relied on a convenience sampling strategy for recruitment [17].

Descriptive Statistics

IBM SPSS Statistics version 22 was used to calculate the results of this study. The description of the sample included those participants from the orientation group and those from the simulation group. (Table 2) shows an equal number of n=100, 100 participants were surveyed. Of the 100 participants, 50 responded from the orientation group and 50 responded from the simulation group.

Participation	Sex	Discipline	No. Years Worked
Orientation	50	50	50
Simulation	50	50	50
Total	100	100	100

Table 2: Participant Frequency.

A breakdown and comparison of the sex of the groups' participants is in (Table 3). The orientation group yielded 78% female and 22% male respondents while the simulation group yielded 88% female and 12% male respondents. Each of the 100 participants represents from both groups identified which healthcare discipline they worked. The various disciplines represented in each of the orientation and simulation groups are illustrated in (Table 4). There were 20 different disciplines reported. The greatest number of like disciplines for both groups was 15 registered nurses out of

50 participants for the orientation group and 33 registered nurses out of 50 participants for the simulation group respectfully.

		Orientation	Simulation	Percent
Sex	Male	11	6	17
	Female	39	44	83
Total		50	50	100

Table 3: Sex Frequency.

Participation	Discipline	No. of Participants
Orientation	Pharmacy	3
	Nursing (Registered Nurse)	15
	Nursing (Certified Nurse's Assistant)	9
	Surgery	1
	Dietary	3
	Environmental Services	5
	Echophysics	1
	Clerical	2
	Administration	1
	Polysomnography	2
	Medicine (Physician Assistant)	2
	Patient Transportation	2
	Security	1
	Rehabilitation	1
	Phlebotomy	2
Simulation	Pharmacy	1
	Nursing (Registered Nurse)	33
	Clerical	3
	Medicine (Physician Assistant)	1
	Medicine (Physician)	4
	Multi-Care Patient Technology	3
	Cardiac Services	1
	Psychiatric Screening Services	3
	Respiratory	1
Total		100

Table 4: Discipline.

Lastly, (Table 5) represents the total number of years work in the reported discipline. The results shown indicate that 40% of the respondents in the orientation group had zero to >1-year experience in the selected discipline. The greater number of participants in the simulation group representing a range from 1-40 years worked was eight years working in that respected discipline that equivocated to 12% or six participants from the simulation group. In addition to the descriptive statics, several other comparisons were completed.

Participation	No. Years Worked	Frequency	Percent Represented
Orientation	>1	20	40
	1.5	1	2
	2	5	10
	3	2	4
	4	2	4
	5	1	2
	6	2	4
	6.5	1	2
	7	2	4
	8	1	2
	9	1	2
	10	4	8
	12	1	2
	13	1	2
	19	1	2
	20	2	4
	25	2	4
	36	1	2
Simulation	1	2	4
	2	1	2
	3	4	8
	3.5	1	2
	4	1	2
	5	1	2
	6	2	4
	7.5	1	2
	8	6	12
	9	2	4
	10	2	4
	11	2	4
	12	2	4
	13	2	4
	13.75	1	2
	15	1	2

	16	2	4
	16.5	1	2
	18	1	2
	19	1	2
	20	2	4
	22	1	2
	25	3	6
	26	1	2
	28	1	2
	30	1	2
	33	1	2
	34	1	2
	35	1	2
	39	1	2
	40	1	2
Total			100

Table 5: No. Years Worked in Discipline.

Summary of the Results

A summary of the results showed there was not a statistical difference in the overall perception of interprofessional collaboration and communication for individuals from various healthcare disciplines who had participated in an interdisciplinary training experience and individuals from various healthcare disciplines who had not participated in an interdisciplinary training experience. In contrast, when the individual category of perceptions of interdisciplinary collaboration and communication were analysed, there was a significant difference in those perceptions of questions. However, there remained no significant difference when analysing the specific categories of group and organizational aspects of interdisciplinary collaboration and communication. The next section will explain the details of the results.

Detailed Analysis

The PINCOM-Q: Perception of Inter-Professional

Collaboration Model Questionnaire along with a demographic survey was used to collect the research data [19]. The survey tool PINCOM-Q: Perception of Inter-Professional Collaboration Model Questionnaire (Appendix A) is a 48-item, 7-point Likert scale which ranged from 7 = strongly disagree to 1 = strongly agree. This questionnaire was also broken down into twelve (C1- C12) subdivisions of participants' perceptions, which are: "Motivation, role expectations, personality style, professional power, group leadership, communication, coping, social support, organizational culture, organizational aims, organizational domain, and organizational environment" [56,60]. Each of these topics is broken down further into three separate categories: individual, group, and organizational aspects related to the activity. The demographic results and these three larger categories were this study's main focus.

Perception Statistics

In addition to the descriptive statistics that were compiled, the perceptions of those receiving the simulation exercise together with those who were part of the orientation class and did not participate in a simulation exercise were compared. Independent samples t-tests were conducted to make a comparison of the two groups surveyed who received the interdisciplinary training exercise and those who did not. Furthermore, individual, group and organizational perceptions of interdisciplinary collaboration and communication were compared between the orientation group and the simulation group. The significance of evaluating the three separate categories of individual, group, and organizational aspects of collaboration with professionals from other disciplines is to see if the perception of interdisciplinary collaboration is greater in one section such as individually, in a group, or organizationally over another. It is understood in (Table 6) that the difference in individual perceptions regarding interdisciplinary collaboration and communication has no statistically significant between the orientation group and the simulation group. The significance level is 0.523 is greater than the p value of 0.05 which is representative of a 95% confidence level supporting the hypothesis.

F	Sig.	t	df	Sig (2-tailed)	MD	Std. Error Difference	95% CI	
							LL	UL
3.868	0.523	1.1523	98	0.366	3.98	2.61381	-2.85893	9.29902
		1.1523	85.545	0.37	3.98	2.61381	-2.87277	9.31277

Note. MD= Mean Difference; CL = confidence interval; LL= lower limit; UL = upper limit

Table 6: Independent Sample t test for Orientation vs. Simulation.

Furthermore, an analysis between the orientation and simulation group as associated with the individual aspects of interdisciplinary collaboration and communication category of data collected was performed. (Table 7) Individual Perception Statistics; illustrates the mean and standard deviation of the individual category of results, while (Table 8) shows the independent sample t test for the independent category. This represents the difference in individual perceptions regarding interdisciplinary collaboration and communication has a statistically significant between the orientation group and the simulation group. The p value resulted in this section was 0.001 which was <0.05 therefore it demonstrates that there was a significant difference between the orientation group and the simulation group in respects to the individual aspects of interdisciplinary collaboration and communication. Thus, providing strong evidence against the null hypotheses; therefore,

the null hypothesis is rejected with regards to the perceptions of interdisciplinary collaboration and communication within the organizational aspects section of the survey. However, the standard deviation of 2.23 in the individual category was slightly higher than the mean score of 1.14 between the orientation and simulation group so becomes marginally less reliable as supporting the hypothesis.

Participant	N	Mean	Standard Deviation
Orientation	50	48.04	19.53015
Simulation	50	40.48	7.97506

Table 7: Individual Perception Statistics.

F	Sig.	t	df	Sig (2-tailed)	MD	Std. Error Difference	95% CI	
							LL	UL
11.345	0.001	2.534	98	0.013	7.56	2.98338	1.63957	13.48043
		2.534	64.899	0.014	7.56	2.98338	1.6016	13.5184

Note. MD= Mean Difference; CL = confidence interval; LL= lower limit; UL = upper limit

Table 8: Independent Sample-t test for Individual Perception.

Correspondingly, a comparison of the data collected for both the orientation and simulation group representative of the mean and standard deviation for the group aspects section of survey questions is characterized in (Table 9). Whereas, the independent sample t test for the independent sample t test for group perception is shown in (Table 10). The p value resulted was 0.614 which was >0.05 therefore it demonstrates that there was not a significant different between the orientation group and the simulation group in respects to the group aspects of interdisciplinary collaboration and communication. Thus, providing weak evidence against the null hypotheses, thus failing to reject the null hypothesis in regards to the perceptions of interdisciplinary collaboration and communication within the group aspects section of the survey. However, the reflective standard deviation of 2.23 represented in the group category was slightly lower than the mean of the score of 3.24 between groups and therefore indicated that it supports the hypothesis so therefore becomes more reliable. Such a contradictory discrepancy may be indicative of a small sample size.

Participant	N	Mean	Standard Deviation
Orientation	50	52.08	14.13902
Simulation	50	48.84	11.90328

Table 9: Group Perception Statistics.

				Sig (2-tailed)	MD	Std. Error Difference	95% CI	LL	UL
F	Sig.	t	df						
0.256	0.614	1.24	98	0.218	3.24	2.61381	-1.94702	8.42702	
		1.24	95.233	0.218	3.24	2.61381	-1.9489	8.4289	

Note. MD= Mean Difference; CL = confidence interval; LL= lower limit; UL = upper limit

Table 10: Independent Sample t test for Group Perception.

Comparatively the data collected for both the orientation and simulation group from the organizational aspect of the survey were paralleled. (Table 11) represents the mean and standard deviation for organization perception statistics category. In addition, the independent sample-t test for organization perception organization is presented in (Table 12). The p value resulted in this section was 0.955 again >0.05 therefore it demonstrates again that there was not a significant difference between the orientation group and the simulation group in respects to the organizational aspects of interdisciplinary collaboration and communication. Once again, this represents weak evidence supporting the hypotheses. This

along with the standard deviation of 2.24 being higher than the mean of 1.14 in this category comparing the orientation and simulation group; therefore, we must fail to reject the null hypothesis with regards to the perceptions of interdisciplinary collaboration and communication within the organizational aspects section of the survey.

Participant	N	Mean	Standard Deviation
Orientation	50	47.76	16.80811
Simulation	50	48.9	19.04908

Table 11: Organization Perception Statistics.

				Sig (2-tailed)	MD	Std. Error Difference	95% CI	
F	Sig.	t	df				LL	UL
0.003	0.955	-3.17	98	0.752	-1.14	3.59271	-8.26963	5.98963
		-3.17	96.504	0.752	-1.14	3.59271	-8.27101	5.99101

Note. MD= Mean Difference; CL = confidence interval; LL= lower limit; UL = upper limit

Table 12: Independent Sample t test for Organization Perception.

Summary

This chapter provides a summary of the results. The purpose of this study was to compare the perceptions of collaboration and communication of individuals from various health care disciplines who have participated in an interdisciplinary training experience and individuals from various healthcare disciplines who have not. A total number of one hundred individuals participated by way of a convenience sampling. This included fifty members in each the orientation and simulation group consisting of healthcare individuals which represented disciplines such as pharmacy, nursing (registered nurses), nursing (certified nursing assistants), surgery, dietary, environmental services, clerical, administration, polysomnography, medicine (physician assistant), patient transportation, security, rehabilitation, phlebotomy, psychiatric screening services, medicine (physicians), multi-care patient technology, cardiac services, and respiratory. The demographic analysis shows an unequivocally greater number of females than males for each group, along with the years worked in the various healthcare disciplines ranging collectively from 0-40 years.

The overall groups' comparison, along with the group category and the organization category generated no significant difference between the orientation and simulation group. The exception resulted in this study was the comparison of the individual perceptions of interdisciplinary collaboration and communication

between the orientation group and the simulation group, which produced a significant difference. The following will include a discussion of the results, and the relationship of these results to the literature. In addition, limitations to the study are discussed along with implication of the results for practice and suggested recommendations for further research.

Conclusions and Discussion

Introduction

Interdisciplinary education and training approaches have been utilized in military from the mid-17th century and in aviation since 1980. The American Hospital Associations (AHA) Physician Leadership Forum [7] described the need for high quality team approach to patient care and recommended interdisciplinary educational training programs to improve interdisciplinary behaviour and the interdisciplinary communication process. There is a developing validation that interdisciplinary healthcare education has a positive impact on patient outcomes [61-63]. The purpose this study was to compare the perceptions of collaboration and communication of individuals from various healthcare disciplines who have participated in an interdisciplinary training experience, and individuals from various healthcare disciplines who have not participated in an interdisciplinary training experience in order to increase awareness for the need of interprofessional education.

This was attained by utilizing a quantitative study design based on Creswell [50] who described quantitative research as a way to collect numerical data, perform statistical analysis, describe, and explain behaviours to constitute reality. The basic quantitative approach and methodology used in this study is a descriptive comparative research study. Chapter 5 includes a summary of the results, discussion of the results, discussion of the theoretical or conceptual framework, a discussion of the results in relation to the literature, limitation to the study, implications of the results for practice, and recommendations for further research.

Summary of the Results

The purpose of this study was to compare the perceptions of collaboration and communication of individuals from various healthcare disciplines who have participated in an interdisciplinary training experience and individuals from various healthcare disciplines who have not participated in an interdisciplinary training experience. As a result, the following research question was generated: "Is there a significant difference in the perception of interprofessional collaboration and communication for individuals from various health care disciplines who have participated in an interdisciplinary training experience and individuals from various healthcare disciplines who have not participated in an interdisciplinary training experience?" Fifty participants were recruited for each group, for a total of 100 participants for the study. These participants represented 20 different healthcare disciplines, ranging from >1 year to 40 years of experience. Of the 100 participants, 48 were registered nurses and a further delineation of the statistics indicated that only 17 of the 100 participants were male while there were 83 females in the study.

When comparing the orientation group with the simulation group it was found that there was no statistical difference in the overall perception of interprofessional collaboration and communication for individuals from various healthcare disciplines who had participated in an interdisciplinary training experience and individuals from various healthcare disciplines who had not participated in an interdisciplinary training experience. This had a 95% confidence level and $p=0.523$, hence supporting the null hypothesis. This study also compared the perceptions of interdisciplinary collaboration by evaluating individual, group and organizational perceptions of participants in the orientation to the simulation group. This study resulted with a $p=0.001$ which was <0.05 therefore it demonstrated that there was a significant difference between the orientation group and the simulation group in respects to the individual aspects of interdisciplinary collaboration and communication, disproving the null hypothesis. The null hypothesis was rejected concerning the perceptions of interdisciplinary collaboration and communication according to the results of the organizational aspects section of the survey.

A group perception comparison between the orientation

group and the simulation group resulted $p=0.614$ which was >0.05 therefore demonstrating that there was not a significant difference between the orientation group and the simulation group in respects to the group aspects of interdisciplinary collaboration and communication. However, since the standard deviation of 2.23 represented in the group category fell below the mean score of 3.24, this supports the hypothesis and is more reliable. Such a contradictory discrepancy may be indicative of a small sample size. An independent sample t test for organization perception resulted $p = 0.955$ again being >0.05 , demonstrating that there was not a significant different between the orientation group and the simulation group in respects to the organizational aspects of interdisciplinary collaboration and communication. Correspondingly, with the standard deviation of 2.24 being higher than the mean of 1.14 in this category, therefore failing to reject the null hypothesis concerning the perceptions of interdisciplinary collaboration and communication within the organizational aspects section of the survey. Together, the group and organization section comparison of the perceptions of interdisciplinary collaboration and communication between the orientation group and the simulation group represent weak evidence supporting the hypothesis.

Discussion of the Results

The research question for this study was, "Is there a significant difference in the perception of interprofessional collaboration and communication for individuals from various healthcare disciplines who have participated in an interdisciplinary training experience and individuals from various healthcare disciplines who have not participated in an interdisciplinary training experience?" A survey comparing these two groups found overall that there was no overall significant difference between the orientation and simulation group. This resulted in accepting the null hypotheses. In the overall comparison, even though the $p < 0.05$, the standard deviation was higher than the mean when comparing the orientation group with the simulation group. Therefore, these results proved less reliable in supporting the alternative hypothesis and more indicative of accepting the null hypothesis [64]. Since the hypothesis is not supported and only a partial answer was obtained the implications regarding the value or clarity of the original research question(s) is arguable. Even though the original hypothesis is not fully supported, the information obtained was valuable and gives support to recommendations for future studies on this subject. According to Campo, et al. [65], that testing the null hypothesis is just one of the elements for evaluating research data. Recruitment procedures, sample size, and confidence intervals should also be considered when evaluating data results. It is not necessary to alter the research questions, but rather to alter the demographic survey questions reflecting the limitations discovered as a direct response to the results.

The 48-question survey was further divided into three categories; individual, group, and organizational aspects of interdisciplinary collaboration and communication perception. The group and organizational categories yielded the same results as the overall comparison of the orientation group when compared to the simulation group. These two categories showed no significant difference in the perceptions of the participants related to interdisciplinary collaboration and communication. However, when the third category of individual aspects of participant's perceptions of interdisciplinary collaboration and communication, revealed there was a significant difference in the individual aspects section. These results supported the alternative hypothesis that there is a significant difference in the perception of interprofessional collaboration and communication for individuals from various health care disciplines taking part in an interdisciplinary training experience and individuals from various health care disciplines who have not participated in an interdisciplinary training experience.

The findings of the group and organizational perceptions related to interdisciplinary collaboration and communication indicated no significant difference but could be related to an initial inequality of group related demographics between the orientation and simulation groups [65]. Burford [66] indicated that interprofessional education was founded to have several benefits including an understanding and expectations of others whereas this may not occur until individuals are in the workplace, thus reflective in the participants' responses based on the number of years worked. Since the orientation group was comprised of 60% of participants that had >1-year experience, it was difficult to ascertain if any of them had previously taken part in a simulation training exercise which could have affected the results of these questions when asked.

Whilst the individual findings of there being a significant difference in the perceptions of interdisciplinary collaboration and communication are indicative of the participant's relationship to the social identity theory [11]. These results show that individuals may not identify with a group or organization until they were placed into these types of situations and self-association to a specific group or organizational alliance occurs [66]. An overview of the importance of utilizing simulation exercises to improve reduce new practitioner stress and improve patient outcomes was stressed by Gore, et al. [67]. The practitioner's practice problem, which drove the need for this study, the individual results would signify that interdisciplinary collaboration and communication needs to be addressed with all healthcare disciplines early in their education, and in the early years worked [1,3,4,7].

Discussion of the Results in Relation to the Literature

A further discussion is necessary in order to place the investigation results in the context of the previously indicated research and justify the approach to this research study.

Concentrating on the relationship between the results related to the theoretical framework helped support the structure around which this phenomenon was built. Furthermore, connecting the relationship between the results and the literature reviewed is essential to bolster support for the study and its findings. Lastly, understanding the study limitations pave the path for recommendations for future research studies.

Relationship Between the Results and the Theoretical Framework

The obvious selection to evaluate the unanticipated results that there was no significant difference in the perception of interprofessional collaboration and communication for individuals from various health care disciplines taking part in an interdisciplinary training experience and those who did not was to examine the theoretical framework of this study. As indicated in similar research, this study did not find the selection of the social identity theory to be ill chosen since the individual aspects perception category of the survey resulted in a significant difference in the orientation group form the simulation group [51]. Tajfel and Turner [23] described the individual perception of self-concept related to the social identity theory as derived from perceived membership in a specific group.

The results of the participant's perceptions in the individual aspects of interdisciplinary collaboration and communication between the orientation and simulation group were statistically different. This leads to the conclusion that not only did they perceive interdisciplinary collaboration and communication differently because they had not participated in a simulation exercise, but they also perceive interdisciplinary collaboration and communication differently in addition to not being part of a group or organization [23]. In unification with the social identity theory, by Hean, et al. [30] determined that perceptions play a key role in behavior and in what individuals think they should say and do in a group setting. In agreement with Strype, et al. [51], the results in the group and organizational aspects categories of the survey only served to enhance that the social identity theory was the appropriate choice for this study because the individuals appeared to conform to selection of being part of group based on the answers to the questions in these sections.

Relationship Between the Results and the Literature Reviewed

In the literature reviewed, Dillon et al. [29] stated unequivocally that simulation was obligatory to improve interdisciplinary relationships. Since there were notable limitations concerning the demographic survey questions, it was difficult to determine if those in the orientation group had been subjected to a simulation training exercise in the past and whether or not the significant number of years working in the selected discipline played a factor in either groups survey answers. Thus, recognition of these

limitations supports the impression that simulation education is necessary to improve interdisciplinary relationships and is evident by the individual perception section being significantly different.

Perceptions of Inter-Professional Collaboration, conducted by Strype, et al. [51] used a scaled down version of the PINCOM-Q: Perception of Inter-Professional Collaboration Model Questionnaire. However, this study focused on a how professionals perceive collaboration, and how those perceptions were organized. The subdivision categories in this survey included group climate, influence, and personal motivation to collaborate. This sample was taken from local municipalities and police departments. These results promoted a conceptual framework by which the municipalities and police departments could facilitate further developments in interprofessional collaboration [51]. This research supported the hypothesis that there is a significant difference in the perception interprofessional collaboration and communication for individuals from various healthcare disciplines who have participated in an interdisciplinary training experience and individuals who have not participated in an interdisciplinary training experience hence aligning with the individual perception section of the survey results.

In contrast, the additional results of this research have shown that there is no significant difference in the perceptions of interdisciplinary collaboration or communication between the orientation group and the simulation group in the group or organization aspects sections of the survey. Historically, professional boundaries have played a role in undermining effective interdisciplinary collaboration and communication between healthcare disciplines [14,40] However, these findings may be as a direct result of the participant's connection to the social identity theory [23]. Tajfel and Turner [23] proposed that group belonging instilled a sense of self-esteem and pride for the individual such that the participants would view their interactions in a group as positive and improve their own value within that group or organization.

Overall, the literature indicated a noteworthy alignment with the research question: Is there a significant difference in the perception of interprofessional collaboration and communication for individuals from various healthcare disciplines who have participated in an interdisciplinary training experience and individuals from various health care disciplines who have not participated in an interdisciplinary training experience? It was determined that various healthcare disciplines have failed to embrace interdisciplinary educational opportunities into practice [1,46]. Negative perceptions of interdisciplinary collaboration and communication remain within various healthcare disciplines, even though interdisciplinary collaboration and communication was deemed crucial in producing positive patient outcomes [3,4,7,38]. Cusack, et al. [37] acknowledged that student perceptions valued

the prospect of working with other healthcare disciplines and therefore supported interdisciplinary education as a student or early in their career. This acknowledgment supports the implication to increase future interdisciplinary education training in all healthcare disciplines.

Limitations. The greatest impact that limitations can have in a research study is the potential impact in which different factors limit findings or the ability to effectively answer research questions and/or hypothesis. It was necessary to assess critically the limitations of this study in order to interpret the implications of the results. Although the sample size was consistent with one that can be inferred upon the larger population of each discipline represented within the study, a sample size of only 100 participants could have attributed to a larger margin of error resulting in the discrepancy when comparison between the individual, group, and organizational aspects of the participant's perceptions [53]. In turn, recognizing these limitations will lead to improvements that can be applied in future research [68].

The first limitation of this study is that participants may have felt obligated to complete the survey because they were in a controlled environment such as an orientation seminar or in a simulation, exercise, training class. The use of this convenience sampling technique allowed for a fast and low-cost way to achieve a large sample size relatively quickly. However, the convenience sampling technique was highly suspect for leading to both under-representation and over-representation of particular groups within the sample as seen with the number of participants represented within each discipline [17]. The second limitation of this study included the process for selecting participants. There was no way of knowing if the groups were equivalent at the beginning of the study. Although group selection is not a threat for a one-group design, it may pose a threat for a two-group design. This limitation may have affected an accurate comparison of the orientation group and the simulation group. It proved to be an imprecise way to obtain the best representation of each discipline and the participant's perception of interdisciplinary collaboration and communication when comparing the orientation group to the simulation group making generality unclear [52].

The third limitation to this study was a threat to internal validity. Possible fatigue on the part of the participants after undergoing the simulation exercise could have led to the simulation group participant's lack of consideration when answering the survey questions in a thoughtful manner. In addition, the survey appearance with consistent font and mind-numbing appearance may have exacerbated the participant's fatigued condition. A 48-question survey could have given the initial impression of being a high level of complexity associated with an extensive time commitment, in turn leading the simulation participants to rush through their answers. This could have led the one to make

inaccurate conclusions about the changes in the independent variable and its influence on the dependent variable, consequently affecting the cause and effect relationship in this study [69].

One last limitation identified upon completion of this study was whether the orientation participant had ever participated in an educational simulation exercise prior to answering this survey. This would have been particularly useful information to have given that the vast majority of the participants had worked in their set discipline for more than one year. If anyone had participated in a simulation exercise prior to taking this survey that experience could have influenced the individual participant survey answers and therefore could not be controlled which could ultimately place restrictions on the methodology used along with the effecting the conclusion when answering the research questions [17].

Implication of the Results for Practice

Healthcare professionals are educated within their own discipline. It is not until real world events place professionals in interdisciplinary settings that collaboration is recognized as being vital for successful patient outcomes [26]. The need to improve interdisciplinary collaboration and communication as well as their impact on the future of healthcare education, healthcare practices, and patient outcomes was recognized by several national and world wide leaders in healthcare [1,7,42]. The results of this research study bring to light the perceptions of interdisciplinary collaboration and communication in the small sample of healthcare disciplines represented. The results show difference in the perceptions of individuals who have not received a simulation training exercise with those who have when comparing the participants' perceptions' in the individual aspect section of the survey. The comparison result suggests that there is a need for healthcare workers to be educated regarding interdisciplinary collaboration and communication. Several notable differences in the results dealt with the various professions having clear goals when working together. There was a clear perception that groups of professionals have expectations contradictory to individual expectations, and that the individuals' roles are not clearly defined. These differences imply that there is a need for interdisciplinary education so that individuals may be able to understand the goals of different healthcare disciplines involved when working in an interdisciplinary group or organization situation.

This research study can influence students, both academic nurse educators and nursing professional development educators, and general healthcare education, as well as have an immediate impact on individuals, team collaboration and patient care [3,38]. The practical implications that may result from this research study are improved communication between disciplines of medicine, nursing and ancillary healthcare professionals and increased use of interdisciplinary training among healthcare educators and schools of nursing [42]. The information gathered from this study may

help nurse educators see the important need for nursing students to work more closely with physicians, other nurses, respiratory therapist and other members of the healthcare team to be able to effectively work as a team member and affect patient outcomes [62]. Understating the results of this study may lead to nursing education curriculum changes and elicit the implementation of improved teaching strategies to include more exercises, which will break down barriers and improve communication among nurses and all members of the healthcare team such as medicine and other healthcare professionals [70]. The increased use of interdisciplinary training exercises gives the nurse educator a way to incorporate non-technical skill performance-based competencies such as communication skills, teamwork, and the ability to improve self-efficacy [71]. Instituting this type of learning in nursing programs will give nursing students a chance to eliminate perceived stereotypes and attitudes about other discipline during situations in a non-threatening environment before experiencing them in a live patient care area. Interdisciplinary training exercises will benefit all healthcare disciplines including but not limited to, security, physicians, respiratory, and both academic nurse educators, nursing professional development educators, and professional nurses involved by giving them an understating of the roles being performed by other disciplines on the healthcare team.

Recommendations for Further Research

A recommendation for future research regarding this topic is to distribute the survey electronically for the participants to complete on their own time rather than adding the survey to an already exhausting day for participants along with offering a small monetary incentive for completing the survey. Correspondingly, while addressing the methodological issue of on-line data collection, Hunter [72] appealed to how the use of incentives may also affect response rates. In addition, the National Science Foundation Advisory Committee for the Social, Behavioural and Economic Sciences Subcommittee on Advancing SBE Survey Research (2015) discussed heightening response rates, using some type of incentive to entice survey completion, and visual survey design to meet the future needs of survey research collection to enhance survey responses. In addition, detailing the instructional design, the structure, learning objectives, and the content covered during the simulation training class would yield to a better understanding of how specific interventions could impact interdisciplinary collaboration and communication. It was also recognized that the orientation group had 60% of its participants answering the demographic question of the number of years worked in their discipline question as being >1 year. The demographic survey questions should have included information as to whether or not the participants had ever participated in a simulation exercise prior to taking this survey and whether or not that had any bearing on how they answered these questions. The answers to these two questions could have affected the overall results.

A comparison of the demographic data of the orientation group and the simulation group could yield potentially helpful statistics when trying to incorporate interdisciplinary collaboration and communication into healthcare education. Additional research may be able to look at sex as a consideration, compare specific healthcare disciplines, and also compare perceptions based on the number of years worked in that discipline to see if these characteristics effect the participants' perceptions of interdisciplinary collaboration and communication. The results from future studies might be used to remove scope of practice barriers, diffuse collaborative improvement efforts, and add to the infrastructure of data collection and analyses of results of interprofessional health care as recognized as future of nursing by the National Academics of Science, Engineering, and Medicine [68]. Further understating the difference in these perceptions could have an impact on how incorporating such education for those who have not had an interdisciplinary simulation exercise exposure could influence interdisciplinary collaboration and communication, hence having an overall positive impact on healthcare.

Conclusion

This study examined the phenomenon of the perceptions of interdisciplinary collaboration and communication. The overall findings suggested that there was no significant difference in the perceptions of the orientation group and the simulation groups, however there was an indication that individual perceptions differed significantly. Further research is needed to develop the limitations recognized in this study so that future recommendations for support of increased and necessary interdisciplinary healthcare education can be implemented as suggested by the literature [1,3,4,7,68]. There was a positive alignment with the social identity theory based on the results of the individual participant perceptions being significantly different while the group and organizational participant perceptions of interdisciplinary collaboration and communication was further aligned with this theory. Carefully organizing the demographic questions to include key participant information and including simulation history will help to narrow survey result discrepancy [72]. These results and the results of further suggested research can have an impact on interdisciplinary education for all healthcare disciplines in the future.

Appendices (A)

Appendix A: PINCOM-Q: Perception of Inter-professional Collaboration Model Questionnaire.

Individual aspects

- (C 1) I find working in interprofessional groups valuable
- (C 1) I get to use my creativity and imagination when I work in interprofessional groups

- (C 1) It is important to be personally engaged when collaborating in interprofessional groups
- (C 1) I experience personal growth when I work in interprofessional groups
- (C 2) I always have clear goals when I work interprofessionally
- (C 2) I experience that other professionals have expectations that are contradictory to mine when I work in interprofessional groups
- (C 2) My experience is that our roles are always clearly defined
- (C 2) I experience that my area of responsibility is clearly defined when I work in interprofessional groups
- (C3) Some professionals act in ways that make interprofessional collaboration difficult
- (C 3) If some professionals had greater insight in their behaviour, collaboration would be easier
- (C 3) Some professionals lack openness and do not participate much in interprofessional groups
- (C 3) Interprofessional collaboration calls for openness of mind and not all professionals are able to live up to that
- (C 4) Some professionals dominate the interprofessional meetings with their professional viewpoints
- (C 4) Some professionals supply the premises in interprofessional groups
- (C 4) Sometimes I am not able to present my perspectives because other high status professionals talk all the time
- (C 4) Occasionally interprofessional groups do not work because some professionals dominate the meetings
- **Group aspects**
- (C 5) I often experience that effective interprofessional groups have a clear and defined leader
- (C 5) It is important that the group leader arrange the work in ways that help the group reach their goals
- (C 5) The group leader seldom influences what the other professionals do
- (C 5) I trust that the group leader will ensure the interest of the group
- (C 6) We almost always solve the defined problems in the interprofessional group
- (C 6) There are seldom collaboration problems in interprofessional groups

- (C 6) In most of the interprofessional groups I participate in, we agree about priorities
- (C 6) Professionals in interprofessional groups are often frustrated with each other
- (C 7) I get relevant feedback on my contributions in the interprofessional groups I participate in
- (C 7) In the interprofessional groups I participate in, exchange of information is never a problem
- (C 7) There is always good communication in interprofessional groups
- (C 7) Professionals are good at exchanging information with each other about how they work
- (C 8) I experience that I can get help and social support from the other professionals in the interprofessional groups I participate in
- (C 8) I find that other professionals in the interprofessional collaboration groups I participate in, are willing to listen to me if I have problems
- (C 8) I find that I am appreciated by other professionals in the interprofessional groups I participate in
- (C 8) I have almost never found that other professionals do not understand what I am trying to express and/or report
- (C 11) Everybody knows their area of responsibility
- (C 11) Everybody knows the area of responsibility of the other professionals
- (C 11) We need to inform each other about our area of responsibility
- (C 12) The needs of the clients are very important for how we work in interprofessional groups
- (C 12) Interprofessional groups exist because the state has decided that professionals should collaborate
- (C 12) Interprofessional groups exist because the clients want them
- (C 12) It is often difficult to get interprofessional groups to work well because professionals represent so many different interests

Strongly Agree						Strongly Disagree
1	2	3	4	5	6	7

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