

NURSE PRACTITIONERS IN ORTHOPEDIC SURGICAL SETTINGS

by

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Abstract

Purpose: The purpose of this culminating project was first to conduct an extensive literature review of Nurse Practitioners (NPs) in orthopedic surgical settings, second to review the literature on how to create a successful professional poster, and then to present the findings of the orthopedic NP review in a professional poster.

Background: Orthopedic conditions account for more disability, pain, and costs to the Canadian/American Healthcare systems than any other conditions. As a result patients are experiencing profound difficulty accessing orthopedic surgeons. As a solution to this shortage, NPs are becoming an essential part of the multidisciplinary orthopedic team in Level 1 trauma hospitals.

Results: NPs are qualified and competent to work in a variety of orthopedic settings including preoperative clinics, primary care orthopedic clinics, as well as provide pre and postoperative care for patients within the hospital setting. The benefits of NPs in orthopedic surgical settings includes: increased access to care, improved team communication, decreased patient length of stay, improved quality of care, and improved patient satisfaction. Moreover, NPs meet patient needs while surgeons are operating, and have a positive impact on resident surgeon education.

Conclusion: A need exists for NPs in orthopedic surgical settings in Canada to both improve access to healthcare for patients, and reduce the burden on orthopedic surgeons.

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Orthopedic Nurse Practitioner Professional Poster

Nurse Practitioners (NP's) have historically been educated and employed in traditional primary care roles in the context of North America (McDonnell et al, 2014; Benham & Geier, 2014; Hiza et al, 2015). However, changes in the health care system, increasing complexities in patient populations, and a reduction in resident physicians specializing in orthopedics has resulted in the implementation of NP's in nontraditional roles in the US (Sebach et al., 2015). According to the literature, there is an increasing need for practitioners in nontraditional specialties such as orthopedic surgery; however the number of NP's currently employed in orthopedics is much lower than in primary care (Ward et al., 2008; Dower & Christian, 2009; Lucas, 2009; Ho & Wilson, 2010; Hollman et al., 2010; Benham & Geier, 2014; Horn, Badowski, & Klingele, 2014; Sebach, Rockelli, Reddish, Jarosinski, & Dolan Jr, 2015). With the successful implementation of NP's in primary care in the US and in Canada (Sangster-Gormley & Canitz, 2014) this project will review the literature on NPs in orthopedic and surgical settings.

This culminating project will be divided into two parts: a literature review and a professional poster. In the literature review, I will discuss the findings including the relevance of orthopedics, a brief background of NP's in primary care and existing orthopedic settings, the logistics of NPs in orthopedics, the benefits and challenges of NPs in orthopedics, and future recommendations. The purpose of the literature review is to synthesize and examine findings on the benefits and complexities of implementing NP's in orthopedic surgical and general surgical settings. In part two, I will conduct a brief literature review on how to create a successful and effective professional poster, and then create a poster outlining the main findings of the orthopedic literature review. The aim of the professional poster is to disseminate the findings of the

orthopedic literature review, and help advance NP practice in BC by creating job awareness and hopefully future opportunities in nontraditional orthopedic surgical settings.

Part 1: Literature Review

Methodology

For the initial literature search, both Medline with full text and Cumulative Index to Nursing and Allied Health Literature (CINAHL) complete were searched. Databases from two disciplines were used to increase the depth of the overall information in the review. The keywords "nurse practitioner" and "orthopedic surgery" were searched. The search was limited to scholarly peer reviewed articles from 2003 and newer; this search yielded 14 articles. After a title and abstract review, six of these articles were found to be relevant and applicable. The keywords "nurse practitioner in hospitals" AND "surgery" were then searched with the same parameters, which yielded 21 articles. After another title and abstract review, three were found to be pertinent. Between the two searches, nine articles were deemed appropriate for inclusion for the literature review.

Literature Review Findings

Relevance of Orthopedics to Current Practice

Orthopedics accounts for a large component of the acute and chronic conditions seen in primary care and in hospital settings. Musculoskeletal conditions account for more disability, pain, and costs to the Canadian and US healthcare systems than any other condition (Haralson & Zuckerman, 2009; MacKay, Canizares, Davis, & Badley, 2010). Benham and Geier (2014) support this, stating musculoskeletal disorders are common, comprising up to two thirds of outpatient office visits. Specifically, chronic orthopedic conditions such as osteoarthritis, osteoporosis, spinal conditions, and repetitive stress injuries which are costly and debilitating,

make up 20-60% of primary care visits in the US and Canada (Haralson & Zuckerman , 2009; MacKay et al, 2010; Benham & Geier, 2014). The amount of chronic orthopedic conditions (such as fractures secondary osteoporosis and obesity) is only expected to increase as the current baby boomer population ages (Haralson & Zuckerman, 2009; MacKay et al., 2010; Benham & Geier, 2014). Moreover, Benham and Geier (2014) state that while musculoskeletal conditions are often not life threatening, most people will be affected by some type of orthopedic condition at some point in their life, thus accounting for a “disproportionate share of disability and health care spending” (p. 603). In regard to fractures alone, 50% of women and 25% of men over age fifty will have an osteoporosis related fracture in their lifetime, “with hip fractures being associated with chronic pain, reduced mobility, increased dependence, and a 20% mortality rate in the first 12 months [following injury]” (Benham & Geier, 2014, p. 604). As evidenced by the literature, a need exists for increased funding and healthcare providers working to serve this demographic. The following section will discuss NPs in primary care.

Nurse Practitioners in Primary Care

Shortages in general practitioners and the changing climate of health care have led patients scrambling to find care providers in primary care (McDonnell et al., 2014; Hiza et al., 2015). This issue is anticipated to become worse as there is a projected shortage of approximately 45,000 primary care physicians (PCPs) by 2020 (Benham & Geier, 2014, p. 603). In response to these shortages, over 60 countries are continuing to develop advanced nursing roles, including an increased acceptance and adoption of NP's in primary care (Schober & Affara, 2006; McDonnell et al., 2014). While the NP role varies among countries, the rising demand for health care providers, rising cost of health care, and physician shortages remains a

prevalent issue and driving force for the remodeling of clinical teams (to include NPs) worldwide (McDonnell et al., 2014).

With these historical conditions driving the creation and implementation of NPs, most have been educated to work in primary care settings to offset the decline in general practitioners. However, changes and remodeling in health care “coupled with growing complexities within the healthcare system have also facilitated the utilization of NPs in nontraditional roles” (Sebach et al., 2015, p. 876). While incorporating NP’s into these nontraditional roles was initially a cost-effective answer to specialist shortages (Hiza et al., 2015), research supports that there are also many benefits for patients, such as increased quality of care and improved healthcare access (Phillips, et al., 2001; Horn, Badowski, & Klingele, 2014; McDonnell et al., 2014). This is supported by Dower and Christian (2009), whose findings in surgical practice mirrored existing research in primary care: the care provided by NPs is equivalent to the care provided by physicians. In addition when hired onto specialty/surgical health care teams, NPs improve communication and access to health care providers which directly increases patient satisfaction (Nyberg et al., 2007; Pezzi et al., 2009; Hiza et al., 2015). Ultimately, NPs in both primary and specialty roles contribute to the provision and implementation of both patient centered and cost effective healthcare (Hiza et al., 2015). The next section will expand on NPs in inpatient and outpatient orthopedic settings.

Nurse Practitioners in Orthopedics

Throughout this literature review it was clear that a need exists for NPs in orthopedic settings (Ward et al., 2008; Dower & Christian, 2009; Lucas, 2009; Ho & Wilson, 2010; Hollman et al., 2010; Benham & Geier, 2014; Horn, Badowski, & Klingele, 2014; Sebach et al., 2015). Across North America, in addition to a shortage of physicians in primary care, patients

are experiencing significant difficulty accessing physicians in specialties including gastroenterology, orthopedics, and dermatology (Dower & Christian, 2009). This is in part, as Lucas (2009) explains, due to changes in the healthcare system beginning in the early nineties. These changes included legislature that reduced the number of hours residents were allowed to work, which forced hospitals to investigate ways to provide the same service to patients with less medical staff (Lucas, 2009; Benham & Geier, 2014).

In addition to reduced resident hours, there was and continues to be a decreased supply of orthopedic surgeons to meet the demands of the population (Ho & Wilson, 2010). For orthopedic surgeons, “the rates of retirement are outpacing the rate of new orthopedic surgeons, and residents are gravitating to other subspecialties ... contributing to a decreased access to orthopedic care” (Benham & Geier, 2014, p. 604). Due to this imbalance in supply and demand, patients are facing above average wait times for orthopedic care, and in some cases are even being sent to other hospitals for simple care such as fracture reduction and casting which can be efficiently performed by providers such as NPs (Ho & Wilson, 2010).

While these healthcare changes have had some negative effects, from a positive perspective they have also helped pave the way for advanced practice nursing positions in these settings (Lucas, 2009). Due to physician shortages, in the past ten years American NP’s have become an essential part of multidisciplinary orthopedic teams, particularly in level I trauma hospitals (Horn, Badowski, & Klingele, 2014). The goals of orthopedic NP’s are “to provide care for common chronic musculoskeletal problems and stable injuries in either primary or specialty care, thus improving access to care for patients and reducing the burden on orthopedic surgeons” (Benham & Geier, 2014, p. 605). NPs are being integrated into both outpatient and inpatient orthopedic settings.

In outpatient orthopedic clinics, NP's are invaluable as they improve primary care access, decrease wait times, reduce surgical cancellation rates, and increase the overall quality of patient care (Dower & Christian, 2009; Horn, Badowski, & Klingele, 2014; Sebach et al., 2015). NPs thrive in these roles as they are educated to differentiate acute versus non-acute musculoskeletal problems from true orthopedic emergencies which require referral to orthopedic specialists (Benham & Geier, 2014).

In inpatient settings, Lucas (2009) reports that orthopedic specialist NP's are as accurate, or more accurate than residents, in taking past medical, surgical, and social histories, providing physical exams, and ordering examinations when needed. More importantly, the majority of inpatient medical concerns can be addressed by the NP, and a plan of care can be initiated without the need to consult another service such as a hospitalist, which was common practice before NPs were on orthopedic teams (Hollman et al., 2010; Horn, Badowski, & Klingele, 2014). An example of a successful interdisciplinary provider team is seen in the Kaiser orthopedic department in California, where NPs are considered active clinical partners and professional colleagues (Dower & Christian, 2009). This is corroborated by Horn, Badowski, and Klingele (2014) who state that NPs are very valuable to the team, particularly in regards to procedures and independent clinical care in inpatient settings. Ultimately, the most appropriate solution to the higher demand for adult and pediatric orthopedic services is the use of NPs who are "capable of providing care equivalent to an orthopedic surgeon for many of the [nonsurgical] problems encountered" (Ward et al., 2008, p. 798). The following sections will discuss the literature findings on the logistics, specific roles, benefits, and challenges of NPs on orthopedic teams.

Logistics of Nurse Practitioners on Orthopedic Teams

NP models of care. There were essentially three different successful models of care for NPs in surgical/orthopedic settings identified in the literature. The first model was very collaborative and involved the NP functioning more as a “physician extender” (Dower & Christian, 2009). In this model the NP would see patients alongside the surgeon and then provide non-surgical care, so that the surgeon could see more surgical specific patients (Ward et al., 2008; Dower & Christian, 2009).

In the second model of care, NP’s functioned more independently and cared for patients who were less complex (Ward et al., 2008; Dower & Christian, 2009; Horn, Badowski, & Klingele, 2014). In the specialty setting described by Dower and Christian (2009) some NPs carried their own patient loads independently for continuity of care. In one variation of this model, NPs either worked under several physicians or partnered one on one with a surgeon and handled most outpatient needs independently without supervision (Dower & Christian, 2009). In another variation of this model Horn, Badowski, and Klingele (2014) explain that NPs provided care and education to their own group of inpatients. The benefit of this model was that it allowed the surgeon to see more complex patients, which increased the rate that new patients were seen and reduced surgical wait times; as a result this model was found to benefit patients and the healthcare system alike (Horn, Badowski, & Klingele, 2014).

In the third model of care, NPs worked as part of the team and functioned in a role very similar to a senior resident (Ward et al., 2008). In this model, NPs would share patients with physicians and evenly distribute the caseload (Dower & Christian, 2009). Dower and Christian (2009) explain that this consisted of an interdisciplinary teams of physicians, NPs, and Physicians Assistants (PA) who worked together to provide specialty surgical care. Dower and Christian (2009) describe a successful example of this model in a top ranked gastroenterology

setting in Florida, where NPs worked collaboratively on a medical team and functioned much like medical fellows or junior attending physicians; in this settings the NPs had a broad scope of competence to evaluate and treat patients in a collaborative setting. While this model functioned well, there were challenges to implementing as each profession must meticulously know each other's strengths and limitations, work collaboratively, and communicate effectively to function efficiently (Dower & Christian, 2009).

Regardless of the model of care used to integrate NPs, the team functioned most optimally when there was mutual trust between disciplines (Dower & Christian, 2009). This meant that specialists were confident in NP skills and had knowledge of their limitations, and that NP's knew when complex cases were out of their scope, and to involve the specialist (Dower & Christian, 2009).

Clinics. While the majority of the studies focused on the NP role in inpatient orthopedics, a benefit was seen with NP's working as part of the orthopedic team in outpatient clinics (Lucas, 2009; Ho & Wilson, 2010; Horn, Badowski, & Klingele, 2014). NP roles in the clinic varied among the studies. First Lucas (2009) discussed how NP's are uniquely qualified to work in preoperative assessment clinics (POA). POAs function to assess patients prior to elective orthopedic surgeries to establish that they still want and need surgery, as well as provide important patient education (Lucas, 2009). NPs in POA clinics provided holistic patient assessments, began to address social issues that may delay discharge, provided clinical coordination with the orthopedic team, and provided education and support to patients prior to surgery and post surgical education (post-op/discharge teaching) (Lucas, 2009). Specific NP duties in POA clinics included history taking, ordering exams/labs, interpretation of results, and physical examination (Lucas, 2009). Sebach et al. (2015) agreed that integrating NP's into

orthopedic preoperative clinics “improved patient outcomes, increased access to care, and reduced health care spending” (p. 876).

Alternatively, a couple studies discussed inpatient orthopedic NPs working one day a week in primary care clinics (Ho & Wilson, 2010; Horn, Badowski, & Klingele, 2014). In this case NPs would see new and existing patients with conditions including stable casted fractures, in-toeing, and for postoperative wound assessment (Ho & Wilson, 2010; Horn, Badowski, & Klingele, 2014). In all studies reviewed, NPs functioned efficiently in an outpatient clinical setting (Lucas, 2009; Ho & Wilson, 2010; Horn, Badowski, & Klingele, 2014; Sebach et al., 2015).

Preoperative care. The majority of studies stated a significant component of the NP role in orthopedics included assessment, examination, and provision of initial care for preoperative patients in the hospital (Dower & Christian, 2009; Ho & Wilson, 2010; Johnson, 2011; Horn, Badowski, & Klingele, 2014; Hiza et al., 2015; Sebach et al., 2015). NPs would assess and treat patients in the emergency department (ED) and manage admission notes and paperwork (Ho & Wilson, 2010). Dower and Christian (2009) reported similar roles, where NPs would “perform nonsurgical orthopedic services, including seeing patients, injecting joints, setting broken bones, and assessing the severity of strains and sprains on hips, shoulders, and knees” (p. 7).

Another important role of the NP was evaluating patients need for surgery (Dower & Christian, 2009; Johnson, 2011; Sebach et al., 2015). In collaboration with surgeons, NPs, hospitalists, and anesthesiologists would perform POA of patients, determine the extent of diseases, and evaluate patients’ cardiovascular status to determine if they were in the optimal medical condition for surgery (Johnson, 2011). Johnson (2011) stated that NP’s made recommendations to reduce peri-operative risk, which was then communicated to the orthopedic

team (Johnson, 2011). Sebach et al. (2015) agreed that NP's were substantially qualified to conduct thorough preoperative assessments, to properly manage patients' medical conditions, and to recognize and reduce actual or possible peri-operative complications (Sebach et al., 2015). In addition, a financial and organizational benefit was seen as NP-led preoperative orthopedic care increased revenue for surgical practices, and increased effective coordination and communication between patients, surgeons, and other care providers (Sebach et al., 2015).

NPs also allowed the orthopedic team another care pathway by seeing patients that required initial reduction of fractures that could be operated on later. These patients were seen by NPs promptly in the ED and were discharged home until they could be operated on, which improved patient access to care and decreased length of stay (Hiza et al., 2015). In regards to fracture reductions, Ho and Wilson (2010) found that when properly trained, NPs can successfully reduce fractures at the level of an orthopedic resident at a busy level I trauma hospital. In fact, "fracture reductions and casting performed by NP's was just as acceptable as residents with no statistical difference on interventions used or outcomes" (Ho & Wilson, 2010, p 245).

Finally, Ho and Wilson (2010) discussed the role of NP's doing call. On-call duties were shared and alternated between residents and NP's, with NP's being available weekdays, and residents on call evenings and weekends (Ho & Wilson, 2010). On call duties included initial evaluation of all orthopedic patients, including reduction of fractures (Ho & Wilson, 2010). In conclusion, the literature supports that NPs are qualified, independent, advanced practitioners, who are ideal to provide preoperative care as part of an orthopedic team (Dower & Christian, 2009; Ho & Wilson, 2010; Johnson, 2011; Horn, Badowski, & Klingele, 2014; Hiza et al., 2015; Sebach et al., 2015).

Postoperative care. In regards to postoperative care, NP duties on the orthopedic team were similar across all studies. NP roles included assisting orthopedic residents with daily floor work such as coordination with social work needs and documentation (Hiza et al., 2015). NPs played an integral role in patient care, rounding on postoperative patients, and even in a few settings, assisting in operating room (Ho & Wilson, 2010, p. 244). Ho and Wilson (2010) explained how NP's functioned similar to residents under an orthopedic attending: they would round on their teams patients on the ward and manage paperwork (Ho & Wilson, 2010). Horn, Badowski, and Klingele (2014) reported similar duties, where the NPs collaborated with physicians and performed complex dressing changes and procedures such as casting, removing drains and surgical pins, central lines, and chest tubes (Horn, Badowski, & Klingele, 2014). Finally, NP's were responsible for coordinating discharge protocols and education for all hospitalized orthopedic patients (Ho & Wilson, 2010; Horn, Badowski, & Klingele, 2014; Hiza et al., 2015). The following section will discuss the benefits of NPs in orthopedic surgical settings.

Benefits of Nurse Practitioners

Increased access to care. NPs in specialty settings helped increase patient access to care (Dower & Christian, 2009; Horn, Badowski, & Klingele, 2014; Hiza et al., 2015). Dower and Christian (2009) stated that delays in access to specialists in orthopedics is largely the result of changing disease and population patterns, and a gap between the supply and demand of physicians. With a shortage of orthopedic specialists, "new practice models that include integrating NPs to provide advanced specialty care have emerged as a feasible alternative" (Dower & Christian, 2009, p. 3). In a study by Horn, Badowski, and Klingele (2014) the orthopedic ward adopted a 1:1 NP and surgeon model; this was very successful in increasing

patient access to care. In fact, Horn, Badowski, and Klingele (2014) found that prior to implementing their care model patients were waiting a higher than average amount of time for initial office visits prior to elective surgery. Implementing this model increased the volume of patients being seen in the office, and a resulted in an 18% increase in surgeries in one year (Horn, Badowski, & Klingele, 2014). Hiza et al. (2015) supported this finding, stating NP's increase access by providing availability to patients in clinics and orthopedic wards, and are able to care for patients' immediate needs.

In a literature review of NP and PA practice by Dower and Christian (2009), participants reported NPs to be an integral part of specialty and surgical practice (including orthopedics) as they reduce the number of patients awaiting care, which "increased patient satisfaction, and improved the overall quality of care received" (p 6). The notion of NPs increasing access to care is also supported in inpatient gastroenterology specialty medicine; the response to NPs in this setting was so positive that the department head reported the whole service ran more efficiently, and estimated patient wait times were reduced from six to three months, a 50% reduction (Dower & Christian, 2009). Moreover, in busy level I trauma hospitals, the 1:1 model had become the practice standard which every attending in the orthopedic department followed, as it increased access to care, improved hospital revenue, and improved patient and family satisfaction, while reducing readmission rates (Horn, Badowski, & Klingele, 2014). Overall, multiple studies supported that NPs in orthopedic and specialty settings resulted in an increase in patient access to care and surgeries (Dower & Christian, 2009; Horn, Badowski, & Klingele, 2014; Hiza et al., 2015).

Increased communication. NPs in specialty surgical settings lead to improved communication among the healthcare team and with patients (Nyberg et al., 2007; Dower &

Christian, 2009; Pezzi et al., 2009; Newhouse et al., 2011; Horn, Badowski, & Klingele, 2014; McDonnell et al., 2014; Hiza et al., 2015; Sebach et al., 2015). First, healthcare teams experienced improved communication with an NP on the orthopedic team. Hiza et al. (2015) reported that one goal of the addition of an NP to the orthopedic team was for the NP to improve communication and act as a liaison between the team and the physiotherapists, social workers, nurses, and other physicians. Hiza et al. (2015) reported that the best time to communicate with interdisciplinary team members is when they are available weekdays (on average 9am to 5pm) which coincides with peak operative hours of surgeons and residents. Before adding NPs to orthopedic units, communication related to discharge planning, physical therapy, and social services was often delayed until after residents finished operating (Hiza et al., 2015). A full-time NP working during similar times to the interdisciplinary team improved patients experience by improving access to a provider during operative hours; this lead to better overall communication with the orthopedic and interdisciplinary teams (Nyberg et al., 2007; Pezzi et al., 2009; Hiza et al., 2015; Sebach et al., 2015). Specialists in a study by Dower and Christian (2009) agreed that a team care delivery model (of NPs and surgeons) should be widely adopted. NPs act as communication links between care providers, and “helped to improve coordination, significantly reduced wait times, increased access to care, and helped specialists tend to more complicated cases, which ultimately expanded specialist practice to meet the increasing population needs” (Dower & Christian, 2009, p. 6).

Patients also reported improved communication when NPs were a part of the orthopedic team (McDonnell et al., 2014; Hiza et al., 2015). An integral part of the NP role is patient education about discharge teaching and postoperative (Horn, Badowski, & Klingele, 2014). In fact, patients reported better communication, continuity of care, and a positive overall experience

of hospital care with NPs in surgical settings (Newhouse et al., 2011; McDonnell et al., 2014; Hiza et al., 2015). In general NPs were successful in increasing communication which contributed to bringing together the interdisciplinary team, further improving patient care (Horn, Badowski, & Klingele, 2014; McDonnell et al., 2014; Hiza et al., 2015; Sebach et al., 2015).

Decreased length of stay. An emerging theme in the literature was that the addition of NPs to orthopedic and surgical settings helped reduce the overall patient length of stay (LOS) (Cowan, Shapiro, Hays, & Afifi, 2006; Lucas, 2009; Hollman, Johnson, & Frim, 2010; Lome, Stalnaker, Carlson, Kline, & Sise, 2010; Newhouse et al., 2012; Williamson et al., 2012; Horn, Badowski, & Klingele, 2014; McDonnell et al., 2014; Hiza et al., 2015). In a study by Lucas (2009), the emphasis on decreasing the LOS for acute inpatients in orthopedic and trauma settings helped the creation of the role/opportunity for an orthopedic NP. Many findings supported that a reduced LOS was successfully achieved with the addition of an NP. First, NPs improved patient health outcomes which contributed to a decreased LOS (Newhouse et al., 2012; McDonnell et al., 2014). Second, NP roles in surgical units led to enhanced detection of patient decline, therefore reducing complications which might increase LOS (Williamson et al., 2012; McDonnell et al., 2014). Finally, NPs helped to significantly reduce LOS for patients requiring more extensive coordination and communication with the interdisciplinary team prior to discharge (Williamson et al., 2012; McDonnell et al., 2014; Hiza et al., 2015). As a result, LOS was reduced in patients “needing to be transferred to rehab facilities, patients 60 and older, and patients discharged on IV antibiotics, or woundvac therapy” (Hiza et al., 2015, p. 229). Overall, a team approach inclusive of NPs in orthopedic surgery notably decreased LOS (Cowan, Shapiro, Hays, & Afifi, 2006; Horn, Badowski, & Klingele, 2014).

The literature also supported that through a decreased LOS, a financial benefit was seen for hospitals and surgeons (Cowan, Shapiro, Hays, & Afifi, 2006; Horn, Badowski, & Klingele, 2014; Hiza et al., 2015). First, a team approach with physicians and NPs decreased LOS which improved hospital profit (Cowan, Shapiro, Hays, & Afifi, 2006; Horn, Badowski, & Klingele, 2014). For example, Hiza et al. (2015) projected that through the decreased LOS, based on an average rate of \$2000 per night in the hospital, in one year the health authority saved 1.1 million dollars by hiring NP's. This is supported by McDonnell et al. (2014) who found NPs improved health outcomes and reduced LOS in both a cost-effective and timely manner. Second, surgeons themselves saw a financial benefit of hiring NP's to the surgical services (Horn, Badowski, & Klingele, 2014). A decreased LOS, where patients are discharged in a more efficient and timely manner resulted in surgeons increasing their surgical volume, productivity, and overall revenue (Horn, Badowski, & Klingele, 2014).

Improved quality of care. There was a positive correlation in the literature that NPs in orthopedic and surgical settings helped improve the quality of care patients received (Phillips, et al., 2001; Horn, Badowski, & Klingele, 2014; McDonnell et al., 2014). Horn, Badowski, and Klingele (2014) found that NP employment in orthopedics improved patient care over and above the normal resident driven care previously in place. However, it is important to note that NPs are not meant to be a replacement for residents, but rather work with residents to bring expertise and knowledge which are essential for delivering quality and holistic patient care (McDonnell et al., 2014). Therefore, patients receive a higher level of care when NP's and physicians collaborate to develop a combined model of care, and share patient workload through a team based approach that takes advantage of both respective professions (Phillips, et al., 2001; Horn, Badowski, & Klingele, 2014; McDonnell et al., 2014).

The literature also found that NPs enhanced patient safety which led to improved quality of patient care, and that the clinical decisions and care provided by NPs was comparable to physicians (Horn, Badowski, & Klingele, 2014; McDonnell et al., 2014). This demonstrates that NPs are safe practitioners who make clinical decisions comparable to and not below their physician colleagues. Ultimately, NPs providing care that is traditionally performed by residents in acute surgical (orthopedic) settings had a positive impact on the quality of patient care (McDonnell et al., 2014).

Increased patient satisfaction. NPs in specialty surgical settings were either comparable to physicians or led to improved patient satisfaction with care (Laurant et al., 2004; Griffith & Melby, 2006; Coddington & Sands, 2008; Horn, Badowski, & Klingele, 2014; McDonnell et al., 2014). Findings in a systematic review of NPs in various medical surgical settings found that when comparing NP and physician care, there was a high level of evidence to support comparable levels of patient satisfaction (Newhouse et al., 2011). However, other findings in this literature review found that patient satisfaction was improved with the addition of NPs. Horn, Badowski, and Klingele (2014) found that an NP/Surgeon model enhanced patient satisfaction due to improved communication, better accessibility of the NP, and a sense of continuity as NPs in this study were seen in both the hospital and clinic settings. In fact, patients reported seeing the same NP helped build trust and the sense that there was a commitment to their personal medical issues (Horn, Badowski, & Klingele, 2014). This supports that a full-time NP in orthopedics increases patient satisfaction.

Furthermore, NPs had a positive impact on patient outcomes and safety, which improved overall patient satisfaction with the care received (Griffiths et al., 2008; McDonnell et al., 2014). In the ED where NPs saw patients preoperatively, NPs were found to reduce orthopedic patient

wait times which improved both outcomes and overall satisfaction (Laurant et al., 2004; Griffith & Melby, 2006; Coddington & Sands, 2008; McDonnell et al., 2014). Most findings supported that NP roles in specialty settings have a positive impact on patients' health outcomes and therefore patient experiences with healthcare (McDonnell et al., 2014).

Decrease in residents. The appointment of the reduced hour work week for residents has led to many teaching hospitals scrambling to find adequate replacements (Hilbert, 2006; Ho & Wilson, 2010; Hiza et al., 2015). According to McDonnell et al. (2014) the adoption of this reduced hour work week for residents and “junior physicians has resulted in the initiatives that have expanded and extended the traditional scope of nursing” (p. 790) including the appointment of NPs to complement or replace roles historically filled by physicians in orthopedics and surgery. An example of this is seen in pediatric orthopedics, a specialty that is currently experiencing a workplace shortage, and a further impending shortage projected as the average age of pediatric surgeons in North America is 52 (Ho & Wilson, 2010). In an effort to meet this demand, NPs are being increasingly incorporated into a pediatric orthopedic service in hospitals and clinics in the US (Ho & Wilson, 2010).

Positive effect on resident education. Orthopedic units in level I trauma centers are academic centers that rely heavily on residents (Pezzi et al., 2009; Hiza et al.). In addition to the positive impact on patients' experiences of healthcare (Horn, Badowski, & Klingele, 2014), hiring NP's has demonstrated a positive effect on resident education (Pezzi et al., 2009; Hiza et al.). Hiza et al. (2015) state that due to the high number of residents in teaching hospitals, “orthopedic settings in level one trauma hospitals see a greater benefit from hiring a dedicated advanced practice provider such as an NP” (p. 229). As experienced healthcare providers, NP's serve as mentors to junior residents in appropriate care and management of floor patients (Hiza

et al., 2015). Moreover, for orthopedic surgeons, “balancing maximal resident education with a commitment to patient care remains a concern in the current era” (Ho & Wilson, 2010, p. 247).

As a result, NPs allow orthopedic surgeons to maximize resident education in the OR, while still delivering quality patient care through an NP on the unit. Overall, NPs add tremendous value to orthopedic and surgical services, as they improve patient care, reduce length of stay, and advance resident education by allowing residents the time to become more involved in surgical and clinical cases (Hollman, Johnson, & Frim, 2010; Lome, Stalnaker, Carlson, Kline, & Sise, 2010; Horn, Badowski, & Klingele, 2014; Hiza et al., 2015). The next section will discuss the challenges of implementing NPs into orthopedic surgical settings.

Challenges of Implementing Nurse Practitioners in Specialty Settings

There were very few general challenges identified in the literature regarding the implementation of NP's in specialty settings. The three main barriers identified were misuse of NPs, initial reluctance of specialists to work with NPs, and lack of continuity when regular NPs were not hired (Dower & Christian, 2009; Horn, Badowski, & Klingele, 2014; McDonnell et al., 2014). Dower and Christian (2009) reported that the biggest barrier in their study was specialists excessively or inappropriately using NPs. This took place in the form of providing NPs insufficient training, a lack of support, or irresponsibly pushing NPs to work outside of their professional limits and scope; both examples resulted in decreased quality of care (Dower & Christian, 2009). Another example of misuse was discussed by Horn, Badowski, and Klingele (2014) where NPs were initially underutilized; this included being assigned clerical work, or designated tasks that were below their scope. Once NPs became more experienced in their setting, they were eventually used to their full potential, and became a very successful part of the team (Horn, Badowski, & Klingele, 2014). Another challenge was discussed by Dower and

Christian (2009) where there had been specialist reluctance to accept NPs, as they lacked knowledge of the NP scope, role, and competence. These physicians reported that their uncertainty resolved once they worked with competent and appropriately trained NPs, and saw the benefit to patients and providers alike (Dower & Christian, 2009). Finally, Horn, Badowski, and Klingele (2014) discussed a barrier identified by patients when being seen by multiple NPs. Having a different NP every day in the hospital or clinic led to discontinuity of care, and was confusing for patient and caregivers (Horn, Badowski, & Klingele, 2014). These examples of misuse helped support the need for advanced orientation and mentoring by the orthopedic surgeon as well as the importance of NPs practicing in full time positions within their full scope to contribute to a better continuity and quality of care for patients.

NP orthopedic education. In addition to some of the challenges identified above, a theme emerged in the literature regarding the inconsistency and informality of NP specialty orthopedic education (Ward et al., 2008; Dower & Christian, 2009; Lucas, 2009; Ho & Wilson, 2010; Benham & Geier, 2014). While these findings were from a study of orthopedic NPs in primary care, Benham and Geier (2014) found that many primary care physicians and NPs were inadequately prepared to properly manage and care for musculoskeletal issues and conditions. Moreover, many NPs reported feeling underprepared to competently assess and manage these conditions, because of limited time spent on education of musculoskeletal content in school (Benham & Geier, 2014).

A bigger challenge identified was that post master's education in medical specialties (including orthopedics) are not offered to NPs (Dower & Christian, 2009). This puts NPs in a disadvantageous position to specialize in orthopedics as their masters curriculum does not adequately prepare them to manage musculoskeletal conditions, and no formal training exists in

orthopedics for those who wish to pursue it. Lucas (2009) reported that NPs expressed difficulty in accessing appropriate and relevant orthopedic education for their roles. As a result, the few NPs currently practicing in orthopedic specialties have received their training on the job through physician mentorship and supervision, and not through a formal training program (Dower & Christian, 2009; Benham & Geier, 2014). This on-the-job mentorship and training “residency” ranged from setting to setting. Ward (2008) reported an average of three to six months of observation and evaluation to build up necessary orthopedic knowledge. Ho and Wilson (2010) reported approximately 6 months to develop skills and observe practices and procedures. Dower and Christian (2009) reported training from several months to a year before NPs achieved the perceived level of competency required to practice (Dower & Christian, 2009). As evidenced the level of training deemed necessary for an NP to practice in orthopedics was very inconsistent.

Regardless of the length of on-the-job training, the underlying question is: why does post-masters specialty training not exist in orthopedics? Dower and Christian (2009) discussed the conflict in formal specialty training for NPs; from one perspective there is a concern that “formalized training may pigeonhole NPs into specialties creating additional barriers to overall primary care access” (p. 9). However they also report a “lack of standardization of specialty training may impede NP mobility, which decreases access to care by perpetuating an insufficient supply of providers working in specialties” (Dower & Christian, 2009, p. 9). Regardless of the argument, the general consensus in the literature is that there are many benefits seen to adding NPs into orthopedic surgical settings, and post master’s specialty education in orthopedics would help formalize this role, and increase the likelihood that NP’s will be hired into these positions (Ward et al., 2008; Dower & Christian, 2009; Lucas, 2009; Ho & Wilson, 2010; Benham & Geier, 2014).

Future Recommendations

The literature supports the integration of NPs into orthopedic settings. However, the educational framework does not yet exist to formally educate or support the transition of NPs into orthopedics practice. Dower and Christian (2009) discussed that several surgeons and specialists reported interest in post-graduate advanced practice training programs to standardize NP education and help ease hiring. This illustrates that specialists are eager and willing to hire NPs into orthopedic and other specialty roles; however formal post-graduate training would help streamline hiring, and ensure the NPs are adequately prepared. For example, following Benner's *Novice to Expert* model could provide a "theoretical framework for increasing NP orthopedic knowledge and competence, and providing a formal orthopedic residency as a part of a post masters certificate program could provide NPs with an opportunity to achieve orthopedic expertise at the advanced practice level" (Benham & Geier, 2014, p. 605). Further funding and advocating for the creation of these educational programs would help advance opportunities for NPs in specialty settings.

In addition to the lack of formal orthopedic education for NPs, there is also a lack of research on NPs in orthopedic surgical settings. While research exists on the benefit of NPs in primary care, ICU, and general surgery, there is a lack of literature on the impact of NPs in orthopedics (Ho & Wilson, 2010; McDonnell et al., 2014). Ho and Wilson (2010) explained that there is an increasing demand for orthopedic trauma services, and despite this demand there are fewer orthopedists available (Ho & Wilson, 2010). As discussed in this literature review, NPs are more than qualified to fill this gap in orthopedics. Thus, more studies on the impact and benefits of NPs in orthopedics surgical settings could increase physician, public, and health authority awareness and ultimately support the implementation of more NP positions into this setting.

Part 2: Professional Poster

As evidenced by the findings in the orthopedic literature review, a need exists for NPs in orthopedic settings. In order to integrate this role into professional practice, the information discussed in the literature review needs to be disseminated to an audience of health care professionals and authorities as well as the general population of patients and family members. After reviewing the literature, I have chosen to use a professional poster to share these findings.

Professional posters are an effective way to share information and are utilized in a variety of settings (Berg, 2005; Rowe & Ilic, 2009; Durkin, 2011; Bindon & Davenport, 2013, Singh, 2014). Current regional, national, and international nursing conferences all utilize professional posters (Berg, 2005; Rowe & Ilic, 2009; Durkin, 2011; Bindon & Davenport, 2013, Singh, 2014). More specifically, NPs often use poster format to present at meetings and conferences (Berg, 2005; Rowe & Ilic, 2009; Bindon & Davenport, 2013). When posters are created thoughtfully and with clear purpose, they encourage networking, dialogue, and lead to the dissemination of knowledge and research which improves patient outcomes (Berg, 2005; Durkin, 2011; Bindon & Davenport, 2013). While there is little empirical evidence about the worthiness of posters, there is a commonly held belief in the academic community that they are worthwhile for the distribution of research and new ideas and appear to now be a mainstream part of all conferences (Halligan, 2008; Durkin, 2011).

In the following section, I will review the literature on how to create a successful professional poster. I will discuss the advantages and disadvantages. I will outline the pertinent findings as they relate to specific components of a poster including audience and setting, title, and content. I will then discuss the important design aspects of a poster including composition, letting, lines, space and arrangement, and the use of colour. Future recommendations for

successful professional poster creation will be briefly outlined. In conclusion, I will create a professional poster which will be included in the appendix of this paper.

Methodology

For the second literature search, both Medline with full text and Cumulative Index to Nursing and Allied Health Literature (CINAHL) complete were searched. Databases from two disciplines were again used to raise the depth of the information in the review. The keywords "professional" and "poster" were searched. The search was limited to scholarly peer reviewed articles from 2005 and newer; this search yielded 30 articles. After a title and abstract review, eight of these articles were found to be relevant and applicable. After reading the articles, all eight were deemed appropriate for inclusion for the literature review.

Advantages

There were many advantages of professional posters recognized in the literature (Berg, 2005; Rowe & Ilic, 2009; Durkin, 2011; Bindon & Davenport, 2013; Singh, 2014). Posters were identified as a succinct but powerful way to quickly spread pertinent information. Posters enhance knowledge dissemination as they provide concise, informal, visually appealing information which can be viewed quickly by many individuals at one time (Berg, 2005; Durkin, 2011; Bindon & Davenport, 2013). This is supported by Berg (2005) who states a “poster forces the NP to carefully select content for the purpose of brevity, which encourages emphasis on the most vital content” (245).

Another advantage is that images can be used in place of words which can be an influential way to communicate simple to complex information (Berg, 2005; Rowe & Ilic, 2009; Durkin, 2011; Singh, 2014). Poster presentations appeal to visual and kinesthetic learners, and serve to convey scientific knowledge through visual representation; posters can be used in a

variety of scientific subspecialties (Bindon & Davenport, 2013; Singh, 2014). This type of presentation helps simplify complex science and make it more readily accessible for the reader (Singh, 2014).

Posters are also a feasible option for beginner presenters, researchers, and professionals. Posters are less intimidating for novice presenters and offer an ideal opportunity to present organized work in a non-threatening and collegial atmosphere (Berg, 2005; Halligan, 2008; Durkin, 2011; Singh, 2014). Posters are less intimidating and much less expensive to create than flying to and presenting orally at professional conferences (Berg, 2005). On that note, unlike oral presentations, the information on a poster is continuous from conference to conference which decreases variability and increases reliability (Berg, 2005). Another benefit is while only completed research can be orally presented at conferences, research in progress or projects by novice NPs and professionals often qualify for poster presentation; this encourages novice NPs to create posters which also enhances knowledge dissemination (Berg, 2005; Singh, 2014).

Finally, posters help advance NPs in their careers both academically and professionally. The process of creating a poster encourages collaboration and networking among colleagues and disciplines; this enhances self-esteem as a tangible product is created and is easily viewable (Briggs, 2009; Durkin, 2011; Singh, 2014). In addition, posters can “facilitate promotion in academic positions and can even create job opportunities” (Singh, 2014, p 709). Overall there was an overarching theme in the literature that there are many benefits to the creation and sharing of professional posters (Berg, 2005; Halligan, 2008; Rowe & Ilic, 2009; Durkin, 2011; Bindon & Davenport, 2013; Singh, 2014).

Disadvantages

While many advantages were identified, the literature also acknowledged a few disadvantages of professional posters. The first disadvantage is the potential cost; while they are inexpensive to create; they can be very costly to print, which can serve as a barrier (Berg, 2005). The second disadvantage is some authors have identified posters as both superficial and less influential than oral presentations. A few studies discussed how some fields dispute the effect of posters, suggesting they only provide preliminary or limited information on their subject matter (Rowe & Ilic, 2009; Singh, 2014). Berg (2005) also called into question the influence of posters and stated that due to the passive nature of a poster, it may be less influential than oral presentations. In addition, Berg (2005) addressed the concern that if NPs or researcher rely too heavily on posters, it does not encourage oral presentation skill building. The third disadvantage was the profound reliance by posters on appearance. Berg (2005) stated that because posters rely more heavily on visual appeal than on content to attract viewers, without visual impact the content will not be reached (Berg, 2005). This means that if a poster is not attractive enough, important information may be passed over by the reader. The final disadvantage identified was that there are few resources available to guide professionals on how to efficiently present their research in poster form (Singh, 2014). This can prove to be an intimidating task for many nurses which is a barrier to creating a poster. Ultimately, if the prospect of creating a poster results in fear, stress, and anxiety (Briggs, 2009; Durkin, 2011) then many nurses and professionals will choose not create posters at all.

Audience and Setting

The literature identified a few important considerations regarding the setting in which the poster will be displayed, and the target audience for the poster. Berg (2005) reported that it is imperative that a poster is displayed in a setting with good lighting and enough space allotted to

actually display the poster. If the room is not well lit, then colours on the poster may not be visible, reducing visual impact and decreasing the likelihood of catching the attention of the audience (Berg, 2005). Second, it is important that the poster aims to meet the learning needs and interest of the target audience (Bindon & Davenport, 2013). Bindon and Davenport (2013) explain that the more closely the information is aligned with the goals and interests of the audience, the more likely it will hold their attention, and the more meaningful it will be (Bindon & Davenport, 2013). Moreover, on average a person will spend 10 seconds glancing at a poster; the aim of the poster is to draw the reader's attention in that 10 seconds so they continue to read it (Boullata & Mancuso, 2007).

Title

According to Singh (2014) the title is considered the most significant part of the poster because it is the most attention-grabbing. The importance of a good title was mentioned across the literature, with studies emphasizing it should be simple, clear, short, but informative (Berg, 2005; Boullata & Mancuso, 2007; Bindon & Davenport, 2013; Singh, 2014). Given that people are drawn to the upper center section of the poster, this is where the title should be (Berg, 2005; Boullata & Mancuso, 2007). The visibility of the title from a distance was another important feature; the title lettering should be visible from as far as 10-20 feet away, be 2-3 inches high, and should be no more than 10 words (Berg, 2005; Boullata & Mancuso, 2007). Of equal importance is the display of the authors' name and credentials. Singh (2014) explained that directly under the title should be the author's names, institutional affiliations, and contact information, which invites people for future contact (Singh, 2014).

Content

Professional posters act as information story boards, and when design and content are combined well, posters can be a very effective way of disseminating information (Bindon & Davenport, 2013). While the visual appeal of the poster is important, it is nothing without the content. The literature revealed the importance of effective content in a poster; inclusive in this is an identified purpose and framework, the importance of a succinct abstract, and the logistics of the content.

Singh (2014) reports that it is imperative to determine the main message, thesis, or purpose of a poster before creating it. Understanding the purpose or intended outcome will help guide the author on deciding its content (Berg, 2005; Bindon & Davenport, 2013). Understanding the purpose will also help guide the framework or type of poster being created. For example, a clinical report poster should include the problem, a literature review of what is known, and the steps involved in the solution or strategy (Berg, 2005). Alternatively, evidence based posters identify the question/problem, background information, briefly review the literature, and offer future recommendations (Bindon & Davenport, 2013; Singh, 2014). Moreover, following a framework guides the structure as it then provides the sub sections of the poster (Singh, 2014).

The use of an abstract to successfully guide the content of the poster was also discussed in the literature. Numerous studies stated that the abstract can be used as a framework or provide a summary of the content for research posters (Berg, 2005; Boullata & Mancuso, 2007; Singh, 2014). Singh (2014) reported that beginning the poster with a well prepared abstract serves as an outline for the content, and introduces to the audience the topic in a clear and succinct overview. Moreover, Singh (2014) explained that the abstract should be consistent with the data presented in the poster or it will result in confusion for the reader/audience.

Finally, the literature outlined important logistics of the content. Numerous studies stated that the content should use active voice, and be in bullet point in succinct, organized, but brief statements (Berg, 2005; Bindon & Davenport, 2013; Singh, 2014). The content should be organized, readable, but concise enough that it takes only 3-5 minutes to read (Berg, 2005; Boullata & Mancuso, 2007). Alternatively, full sentences, wordiness, and information overload results in either confusion or in the reader avoiding the poster (Berg, 2005). The design of the poster will be discussed next.

Design

Composition. The composition of a poster is how it is visually assembled. Composition is vital as it contributes to the first impression or visual appearance of the poster, which is essential to attract the reader (Berg, 2005; Singh, 2014). There are similar approaches to a successful poster composition described in the literature. Duchin and Sherwood (1990) founded a powerful way to present content through the “rule of thirds” (as cited in Berg, 2005; Bindon & Davenport, 2013). Under this rule, the poster is divided into a 3 by 3 grid with 9 identified areas, where the most important content is placed in the centre grid to highlight its importance (Berg, 2005). This is similar to the study by Boullata and Mancuso (2007) who outlined there should be no more than 3-5 columns of information, with figures being most effective when placed centrally. In addition, the importance of figures for an overall successful composition was discussed. Singh (2014) stated that if information (such as statistics) are not adapted into readable bullets and charts, they will be difficult to read and key points will be missed. However, while images, shapes, and photos add interest and clarify written text, they should be used sparingly to avoid a cluttered appearance (Berg, 2005; Bindon & Davenport, 2013).

Lettering. The design of the lettering is important for the overall appearance of the poster (Berg, 2005; Boullata & Mancuso, 2007; Bindon & Davenport, 2013). The literature identified that simplicity is key in lettering; embellished fonts detract from the poster and fonts with curves are not a legible from a distance (Berg, 2005). In regards to text size, Bindon and Davenport (2013) explain that text should be visible from a 3-5 foot distance, and should be no less than a 24 point font. How the lettering is justified was also identified. Left justification of text was described as most legible, with each point having no more than 50 words (Bindon & Davenport, 2013). Finally, strategies to add emphasis to the lettering were discussed. Berg (2005) explained that the use of contrast, such as dark font on a light background (or vice versa) helps emphasize points. Moreover, changes in font size or style can also help to add interest; section headings can be emphasized by using this technique (Berg, 2005; Boullata & Mancuso, 2007).

Lines. The use of lines to direct that eye through the poster was discussed. Arrows, shapes, lines, and underlining of text helps create movement and flow through the poster, and creates emphasis on important content (Berg, 2005; Boullata & Mancuso, 2007). In fact, Berg (2005) discussed that lines force the eye to move through the poster contents. Lines can also be used for separating individual sections, but need to fit with the overall design of the poster (Berg, 2005). However, Berg (2005) cautioned that too many lines detracts from the poster and result in a cluttered overcomplicated appearance. Thus balance with the use of lines is important.

Space and arrangement. The arrangement and use of space in a poster also contributes to the visual appeal. A powerful way to highlight content is to use negative space (the background) as it helps emphasize and separate content into smaller sections which are easier to read (Berg, 2005). This is supported by Bindon and Davenport (2013) who reported that

overcrowding of text or graphics is taxing to the eyesight of the reader. As a result, simplicity in posters are the most visually appealing to reader (Berg, 2005). In regards to arrangement, Berg (2005) identified that the most important elements should be at eye level and central. Finally, because the flow of the English language is left to right and downward, the flow of the poster should begin at the upper left corner to facilitate a nature progression through the content (Boullata & Mancuso, 2007).

Colour. The effective use of colour is fundamental in the success of a professional poster. Berg (2005) states that colours contribute to visual appeal, highlight the content, and has the ability to manipulate human emotion. Familiar colours “can evoke feelings of nostalgia, warmth, and calm...or alternatively trigger feelings of distress or unease” (Berg, 2005, p. 247). Specifically, reds and yellows are generally stimulating, blues and greens are calming and therefore popular, purple implies authority, white serves as a stark contrast to dark colours and black is dramatic and good against bright colours (Berg, 2005). Thus, the effective use of colour combinations to create mood and emphasis is important in a poster (Berg, 2005; Rowe & Illic, 2009).

In regards to the logistics of colour, the literature revealed that posters with dark backgrounds and light lettering or light colours on white backgrounds are difficult to read and should be avoided (Berg, 2005; Bindon & Davenport, 2013). Numerous studies also reported that again simplicity is key with colour; limiting to 3-4 colours only adds interest and emphasis without overwhelming the reader (Boullata & Mancuso, 2007; Bindon & Davenport, 2013). Finally, using complementary colours achieves successful contrast and increases visual appeal (Berg, 2005).

Future Recommendations

As discussed in this literature review, there are advantages of the use of professional posters to disseminate knowledge. It is also evident that creating a poster is no easy feat and requires education on the logistics for successful execution. However, there is a lack of training and education available to NPs and health care professionals on how to create posters. Durkin (2011) recommends having hospital or organization based poster presentation sessions, that do not require travel, are not costly to attend or create, and are less intimidating than professional meetings; this would allow opportunities for knowledge to be shared in a more informal setting. In fact, in the study by Durkin (2011), annual poster presentation sessions were held, which improved poster development skills, resulted in the generation of new ideas, and were used for professional advancement for staff moving up in their careers.

Conclusion

In conclusion, an effective method to disseminate knowledge is through a professional poster presentation (Berg, 2005). To disseminate the knowledge obtained from this extensive orthopedic NP literature review, a professional poster was developed and was presented at an NP conference. See Appendix A for the completed Poster.

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Appendix A: Professional Poster