Developing an evidence based study into postoperative pain

In spite of recent advances in pain management, postoperative pain still remains a major clinical problem (Gilmartin and Wright, 2007; Manias et al., 2005; Singer et al., 2010) with about 69% of patients experiencing moderate to severe pain after surgery (Apfelbaum et al., 2003).

Postoperative pain, although expected is an undesirable experience after surgery (Good, 1995; Rosenquist and Rosenberg, 2003). When left untreated or inadequately managed, it can negatively affect an individual’s physical, psychological and social well being (Vaughn, Wichowski and Bosworth, 2007). Thus, it generates additional responsibilities for the healthcare provider (Wilmore and Kehlet, 2001) as well as creating economic difficulties for one’s family, society and the nation at large (Vaughn et al., 2007).

Pharmacological interventions have been used as the mainstay in the management of postoperative pain (Dolin, 2002). However, these interventions are not without undesirable effects such as nausea, vomiting, dizziness, drowsiness and allergic reactions (Koch et al., 1998). Analgesic techniques for perioperative pain relief are therefore, being challenged by an ever-increasing demand for complementary and holistic therapies (McCaffrey and Locsin, 2002). Thus, several non-drug techniques can be used as adjuncts in managing postoperative pain (Good et al., 2005).

The use of music as a nonpharmacological technique has prompted various research studies in the area of postoperative pain management (Ikonomidou et al., 2004). Resultantly, several studies have been published on this issue; hitherto, these have produced contradictory findings (Anderson et al., 2005;

Good et al., 2001, 2002, 2005; Heiser et al., 1997; Heitz et al., 1992; Ikonomidou et al., 2004; Nilsson et al., 2001, 2003; Taylor et al., 1998).

In an attempt to find solutions to the efficiency of music as a pain management intervention, an increasing number of systematic reviews (Cepeda et al., 2006; Dunn, 2004; Engwall and Duppils, 2009; Evans, 2002; Nilsson, 2008) have been published during the past years. Nonetheless, the conclusions from these studies may be questionable for various reasons such as poor methodological quality of included studies, limited search strategies, inclusion of studies from only developed countries and being outdated.

With the evolvement of recent studies (Allred, Boyers and Sole, 2009; Cooke et al., 2010; Ebneshahidi and Mohseni, 2008; Good and Ahn, 2008; Hook, Sonwathana and Petpichetchian, 2008; Sen et al., 2009) which continuously report conflicting findings and the flaws identified in previous reviews, this issue needs to be addressed in a more rigorous manner.

The aim of this dissertation is to ascertain the efficacy of music as a postoperative pain management intervention by systematically reviewing the available literature. With the aid of the evidence from already existing literature, this dissertation will commence with the rationale for the proposed systematic review and justification of the review question. In the subsequent chapter, the systematic review methodology will be explored together with the justification for the main decisions of the review. Following this, the results of the proposed review will be presented in the next section. This will be followed by discussions and conclusions on the review. Finally, I will reflect on the learning achieved through the systematic review process and

the implications of the study findings for clinical practice, research and education.

Literature Review

A review of the literature identifies the trends, strengths and limitations of the methodological approaches of a study (Dunn, 2004). Thus, it provides an orientation to the known and unknown aspects of a subject area (Blaxter et al., 1996; Parahoo, 1997; Polit et al., 2001) and directs future studies (Stevens, 1993).

In this section, the rationale and justification of the review question will be provided following the background information and literature on the use of music in managing postoperative pain.

Epidemiology of Postoperative Pain

It has been estimated that more than 73 million surgeries are performed every year in the United States (Apfelbaum et al., 2003). Apparently, the tissue damage and trauma caused during surgery results in acute postoperative pain which may vary in intensity from mild to excruciating pain (Hutchison, 2007).

Recent studies indicate that effective pain management remains elusive for a significant proportion of surgical patients (Dolin, Cashman and Bland, 2002; Svensson, Sjostrom and Haljamae, 2000; Werner et al., 2002). Many of them continue to experience unrelieved postoperative pain (Backstrom and Rawal, 2008) despite years of research into pain and its management (Botti, Bucknall and Manias, 2004; Hutchison, 2007). This may be partly due to the

insufficient training received by healthcare professionals on pain management (American Medical Association, 2010). In addition, many patients have accepted the notion that acute postoperative pain is to be expected during hospitalisation. Thus, the resultant effect is the widespread poor management of postoperative pain (Warfield and Kahn, 1995).

The ineffective management of postoperative pain has been highlighted in the literature (Abbott et al., 1992; Bostrom et al 1997; Donovan et al. 1987). A survey conducted by Oates et al. (1994) revealed that 34% of the 206 patients experienced moderate to severe pain postoperatively. Conclusions from the National Health and Medical Research Council's (1999) report also depicted that about 75% of patients experienced moderate to severe postoperative pain. An inquiry made by Watt-Watson and colleagues also showed that 51% of 225 postoperative patients following cardiac surgery reported of severe pain (Watt-Watson et al., 2000). Moreover, a random national study conducted by Apfelbaum and co-workers illustrated that out of the 80% of patients who reported of postoperative pain, 86% of them were experiencing moderate to severe pain (Apfelbaum et al., 2003). All these continuous reports of moderate to severe postoperative pain draw attention to the inadequacies in pain management (McCaffery & Ferrell, 1997). This is because patients often underestimate their pain due to their high expectations regarding postoperative pain experience (Hutchison, 2007).

Some clinicians and patients also have misconceptions about the use of opioid analgesics which contribute to the inadequate postoperative pain management (McCaffery and Ferrell, 1991). Other factors also include the type of surgery (Rai, 1993), patient's gender, age, preoperative pain and

psychological factors (Bisgaard et al., 2001; Edwards et al., 2004; Granot and Ferber, 2005).

Potentially, technical difficulties with intravenous (I. V.) access lines and patient-controlled analgesia (PCA) devices also serve as contributory factors (Wickstrom, Nordberg and Johansson, 2005). Pharmacokinetic and pharmacodynamic factors may also affect postoperative analgesia (). *A meta-analysis comparing the incidence of pain following three analgesic techniques: I. M. analgesia, PCA, and epidural analgesia after surgery was conducted by Dolin et al. (2002). Data stratification based on the drug administration route revealed that the proportion of patients with moderate-to-severe postoperative pain was highest in I. M. opioid administration group while this was lowest in the epidural opioid group.

In recent times, pain management is gaining increasing attention among healthcare providers and professional bodies (Hutchison, 2007). Thus, January 1, 2001 was declared during a United States congress as the commencement of a “ decade of pain control and research” (American Academy of Pain Medicine, 2010). Furthermore, the American Pain Society (APS) presently urges clinicians to consider pain as “ the fifth vital sign” (Loeser, 2003). This initiative has stimulated more interest and attention to the management of pain. As a consequence of that, several professional and regulatory bodies have recently produced guidelines for managing postoperative pain (American Society of Anaesthesiologists, 2004; American Pain Society, 2003; European Association of Urology, 2003; Veterans Health Administration and Department of Defense, 2002; Joint Commission on Accreditation of Healthcare Organisations, 2001).

Definition of Postoperative Pain

The concept of pain has been a subject for discussion since antiquity. A universally accepted definition of pain is “ an unpleasant sensory and emotional experience associated with actual or potential tissue damage described in terms of such damage” (IASP, 1979: 250). This definition emphasises on the subjective nature of the pain experience which can be influenced by multiple factors (IASP, 2003). As a result of this, McCaffery (1983: 14) defines pain as “ whatever the experiencing person says it is, existing whenever she says it does”.

Postoperative pain is thus, defined as an acute form of pain which is experienced after surgery (Fine and Portenoy, 2007).

Impact of Inadequate Postoperative Pain Relief

Unrelieved postoperative pain can be detrimental to the physiological, psychological and sociological health of patients (Reyes-Gibby, 2002; Strassels, 2000; Vaughn et al., 2007). These negative consequences are derived from various body systems such as the cardiovascular, respiratory, gastrointestinal, renal, neuroendocrine and the autonomic nervous systems (Duggleby and Lander, 2004; Tulay, 2010).

Physically, longer periods of unrelieved postoperative pain can result in physiologic alterations which include the stimulation of the pituitary-adrenal system (Yeager et al., 1987), sympathetic nervous system (Pasero, Paice and McCaffery, 1999) and restricted mobility (Yeager et al., 1987; Murray, 1990) which may result in cardiovascular, gastrointestinal and renal changes (Puntillo and Weiss, 1994; McCaffery and Pasero, 1999). All these changes in

a postoperative may serve as a risk factor for the development of adverse effects such as deep vein thrombosis, pulmonary embolism, pneumonia (APMGP, 1992), coronary ischaemia, myocardial infarction (APMGP, 1992; Jacox et al., 1994; Puntillo and Weiss, 1994; Staats, 1998; McCaffery and Pasero, 1999), reduced immunity (Ikonomidou et al., 2004), poor wound healing (Shang and Gan, 2003) and chronic pain. Psychologically, unrelieved postoperative pain may result in stress, anxiety, depression and demoralisation (Murray, 1990).

In addition, the undertreatment of postoperative pain has potential negative consequences for health systems (Hutchison, 2007). This includes extended periods of hospitalisation (Heiser et al, 1997; Miaskowski, 1993), readmissions (Ikonomidou et al., 2004) and patient dissatisfaction (Shang, 2003). As a result of this, additional responsibilities are placed on the healthcare provider which may lead to staff exhaustion and its resultant sick leaves (Wilmore and Kehlet, 2001). Subsequently, these may increase the overall costs of hospitalisation and place health systems at a disadvantaged position, especially in today’s competitive healthcare environment (Henry, 1995). Ultimately, these negative consequences have a enormous impact on the patient’s family, society and the nation at large (Vaughn et al., 2007).

Pain Management

The importance of addressing the complex issues of pain management cannot be overemphasized (Botti, Bucknall and Manias, 2004). Apart from reducing unnecessary suffering, effective pain control improves patient outcomes (Wasylak et al., 1990; Watwill, 1989; Sydow, 1989) and enhances their quality of life (Goudas, 2001; Reyes-Gibby, Aday and Cleeland, 2002;

Rogers et al., 2000a; Rogers et al., 2000b; Strassels, Cynn and Carr, 2000). It is generally accepted that needless suffering from pain in any patient is unethical (Söderhamn and Idwall, 2003) and illustrates a betrayal of the healthcare professional’s commitment to serve humanity (Ikonomidou et al., 2004). This is because patients are entitled to good quality care (Rawal, 1999; Idwall, 2004). Important goals for postoperative pain management are therefore to promote comfort, quicken recovery and avoid complications (Ready and Edwards, 1992).

Pharmacological interventions have been used as the mainstay in managing postoperative pain (Dolin, 2002). Nevertheless, these interventions are not without unwanted adverse effects such as nausea, vomiting, dizziness, drowsiness, and allergic reactions (Koch et al., 1998). Thus, nonpharmacological methods have been used as adjuncts in the treatment of postoperative pain (Ready and Edwards, 1992).

*Combining pharmacologic and nonpharmacologic methods of pain provides effective pain relief for the patient (McCaffery, 1990). Thus, the nurse may make a significant contribution to postoperative pain management by offering the patient various non-drug techniques that can be used concurrently with analgesics (McCaffery, 1990; McCaffery and Beebe, 1989).

Nonpharmacologic interventions have been known to be valuable, simple and inexpensive adjuvants to analgesic techniques (Hyman et al., 1989). As a result, several non-drug techniques can also be used as adjuncts in managing postoperative pain (Good et al., 2005). Specifically, the use of music as a nonpharmacological technique has prompted various research

studies in this area (Ikonomidou et al., 2004), leading to the publication of numerous studies (Anderson et al., 2005; Good et al., 2001, 2002, 2005; Heiser et al., 1997; Heitz et al., 1992; Nilsson et al., 2001, 2003; Taylor et al., 1998) and reviews (Cepeda et al., 2006; Dunn, 2004; Engwall and Duppils, 2009; Evans, 2002; Nilsson, 2008).

History of Music Therapy

Music, as a remedy for sickness is a prehistoric concept (Todres, 2006) that has been used to influence human health (Bunt, 1994; Nilsson, 2003; White 2000).

It is the art of listening to sounds that usually have rhythm, pitch (Funk and Wagnall, 1998), melody and harmony (Steckler, 1998). Throughout history, music has been used as an alternative therapy to promote the wellbeing of patients (Guzzetta 1988). Thus, music therapy can be defined as the act of using musical sounds to support the physical, psychological and social needs of an individual during illness or disability (Aluede, 2006; Munro and Mount, 1978). Its main goal is to promote comfort by serving as a diversionary measure from an unpleasant occurrence (Nwokenna, 2006).

Archaelogical findings reveal that the sick primitive man used music as a way of pacifying the “ gods” (Henry 1995). Also, the Egyptians of 1500 BC used music to enhance their fruitfulness while the Greeks and Romans strove for human body and soul integration using music (Buckwalter, Hartsock and Gaffney, 1985). Thus, Apollo, the Greek god of mythology, was considered as the giver of medicine and music (Todres, 2006).

There is anecdotal evidence from contemporary writings that music was used by Hippocrates to promote wellbeing (Storr, 1994). The sixth century Greek philosopher, Pythagoras, who is considered as the founder of music therapy and geometry, believed that music greatly influenced human health (Olson 1998). As a result, he often prescribed music and diet to reinstate and sustain the integration human body and soul (Bunt, 2001; White 2001).

Also, it was demonstrated by the Renaissance movement group that different types of music affected digestion, blood pressure, respiratory and heart rates (Cook, 1986). In a nameless article that appeared in the Columbian Magazine in 1789, a case was made for the use of musical experiences to influence and regulate emotional conditions (White 2000). Subsequently, a book entitled “ the influence of music on health and life”, which describes the use of music in healing, was written by Chomat in 1846 (Biley, 2000).

From a nursing perspective, music has been used to promote patients’ health and well-being (Chlan, 2002). In the early 1800s, Florence Nightingale noticed the power of music as a vital part of the healing process for injured Crimean soldiers (Nightingale, 1992). After observing different types of music, she remarked that wind instruments with continuous sound or air created a positive effect on patients while those that lacked continuous harmony produced negative effects (Nightingale 1992, McCaffrey and Locsin 2002). Nightingale believed that, it was the nurse’s responsibility to control the environment for healing to take place (Nilsson, 2003; White, 2001; McCaffrey and Locsin, 2002; Nightingale, 1992).

After the invention of the phonograph in the late 1800s, recorded music was used in hospitals to promote sleep and relieve perioperative anxiety (Taylor, 1981). An extensive account of this occurred when healthcare professionals concurrently used music with analgesia and anaesthesia (ibid).

In 1914, music was used for the first time in the intraoperative environment to distract patients from the “ horror of surgery” (Kane, 1914: p. 1829). Afterwards, the National Association for Music in Hospitals was established in 1926 by a nurse named, Isa Maud Ilsen (Ilsen, 1926). After identifying rhythm as the basic therapeutic element, she advocated for the implementation of specific musical prescriptions (Ilsen 1926).

An extensive study on music was made by Hunter, in 1892, after playing a piano in the Helensburg Hospital, Scotland. He noticed that there was a reduction in the patient’s report of pain and temperature following musical exposure (Hunter, 1892). An observation made by Coring (1899) and Tarchanoff (1903) also revealed that different types of music had an effect on the patient’s heart rate, respiration and bodily secretions (Light et al 1949). Also, a group of surgeons in 1949 studied the use of music together with psychosomatic factors. They discovered that music had a calming effect on those patients who were anxious and unresponsive to routine medication (ibid).

With the advent of the technological advancements of the twentieth century, the link between health and music declined (Heitz, Symreng and Scamman, 1992). However, there has been an upsurge interest in music therapy due to

its prominence in pain management (McCaffery, 1979) Thus, it is considered as a vital aspect of the nursing discipline (Paterson and Zderad, 1988).

The Analgesic Properties of Music

The mechanism by which music affects pain responses appears to be as varied as the research paradigms (Pricket and Standley, 1994). Music has been shown to affect the physical, emotional, cognitive and social aspects of the pain experience (Todres, 2006). *Thus, the question is: how does music exert its analgesic properties? In the search for answers to this query, various theories and hypotheses have been proposed (Gagner-Tjellesen et al., 2001).

The auditory stimulation of music produces a biological effect on human behaviour by engaging specific brain functions (Thaut 1990). The effect of music is perceived in the right hemisphere of the brain (Thaut 1990, Liégeois-Chauvel et al., 1998, Myskaja and Lindbaeck, 2000), whereas a greater portion of interpretation occurs in the left hemisphere (Thaut 1990, Myskaja and Lindbaeck, 2000).

Music stimuli serve as a distraction (Good et al., 2000; McCaffery and Good, 2000) and cause the prefrontal cortex to be conditioned to the music, which is more pleasant, (Nilsson, 2008), familiar, relaxing (Mok and Wong, 2003) and preferred (Siegele, 1974; McCaffery, 1992; Mok and Wong, 2003). Patients can thus, focus their awareness from the noxious input unto the music (Fernandes and Turk, 1989; Good et al., 1999; Willis, 1985) to aid relaxation (Beck, 1991; White, 2000; White, 2001; Thorgaard, 2005). Although patients are often in a transitional zone between consciousness

and sleep during the perioperative period, the sense of hearing still persists amidst the impairment of other senses (Nilsson, 2003). As a result, music may be of immense benefit to this population.

The inhibition of the afferent noxious impulses causes the activation of *endogenous opiates, descending nerve impulses, and neuropeptides in the in the central nervous system (Andy, 1983; Yezierski et al., 1983). Subsequently, excitatory neurotransmitters such as substance P, prostaglandins, bradykinins are inhibited leading to reduced muscle and mental tension (Good, 1995; O'Callaghan, 1996; Taylor et al., 1998).

On the contrary, it has also been demonstrated that music, which is inappropriately used, can aggravate pain sensation and thus can increasing pain perception and experience (O'Callaghan, 1996).

The Ghanaian Context

Despite the fact that 3. 5% of the world's surgical operations are performed in developing countries (Weiser, Regenbogen, Thompson et al., 2008), the management of postoperative pain is poor in Ghana (Clegg-Lamptey and Hodasi, 2005; Murthy, Antwi-Kusi, Jabir et al., 2010). This may be due to factors such as inadequate knowledge, negative attitudes (Hall-Lord and Larsson, 2006), discrepancies between healthcare professionals' and patients' assessment of postoperative pain and the lack of relatively efficient analgesic techniques such as PCAs and epidural analgesia (Murthy et al., 2010). Moreover, the use of non-invasive, safe and cheap nonpharmacological interventions such as music is also underutilised.

Music plays a vital role in the life of an African; however, the origin of music therapy in African societies remains a puzzle due to the lack of indigenous written records (Aluede, 2006). Although, many Ghanaians love music (FGMSA, 2010), music therapy in Ghana is currently at its embryonic stage (Kofie, 2004).

Music, as the *stock-in-trade of traditional healers is used in the Ghanaian society. It accompanies their set of dances until they reach the semi-conscious state whereby they begin their communication with ancestral spirits. During this enterprise, music stimulates their ecstasy and they are being offered concoctions that may be used in healing the sick (Kofie, 2004). Music is also an effective form of therapy for patients who believe their ailments is a form of misdemeanour towards others and for that manner receiving punishment from the ancestral spirits (ibid).

Rationale for the Proposed Review

The use of music as a postoperative pain intervention has prompted various research studies (Ikonomidou et al., 2004), leading to the publication of numerous articles (Anderson et al., 2005; Good et al., 2001, 2002, 2005; Heiser et al., 1997; Heitz et al., 1992; Ikonomidou et al., 2004; Nilsson et al., 2001, 2003; Taylor et al., 1998). Nevertheless, these studies have reported mixed/ contradictory/ conflicting findings. While some show improved pain relief (Anderson et al., 2005; Good, 1999; Good et al., 2001; Good et al., 2002; Good et al., 2005; Heitz et al., 1992; Laurion and Fetzer, 2003; Masuda, Miyamoto, and Shimizu, 2005; McCraty et al., 1998; Mullooly et al., 1988; Nilsson et al., 2001; Nilsson et al., 2003), others showed no difference in pain management among study participants (Blankfield et al., 1995; Good,

1995; Heiser et al., 1997; Ikonomidou et al., 2004; Taylor et al., 1998). The approaches used in these studies have mainly been experimental, however, most of them lack strict control with various outcome measures ranging from psychological (pain, anxiety), physical (sleep) to physiological parameters (heart rate, respiratiory rate, blood pressure).

In an attempt to find solutions to the efficiency of music as a pain management intervention, an increasing number of systematic reviews (Cepeda et al., 2006; Dunn, 2004; Engwall and Duppils, 2009; Evans, 2002; Nilsson, 2008) have been published during the past years. Nonetheless, the conclusions from these studies may not be fully supported for various reasons such as poor methodological quality of included studies, limited search strategies, inclusion of studies from only developed countries and being outdated.

Evans (2002) conducted a systematic review on the efficacy of music as an intervention for hospitalised patients. This review included postoperative pain as well as pain occurring after certain procedures. Of the four eligible studies, three of them found no difference in pain scores and analgesic consumption (Blankfield et al., 1995; Good, 1995; Taylor et al., 1998) while the remaining study (Koch et al., 1998) reported a reduction in analgesic consumption among the music intervention group. On this basis, he concluded that music may be an effective diversion in treating pain. This assumption may be obstructive due to limited evidence as at that time and its resultant myopic inference.

A systematic review conducted on the efficiency of music in reducing postoperative pain (Dunn, 2004) was also inconclusive due to the poor methodological quality of the included studies. Moreover, it was also restricted to developed countries such as the United Kingdom and the United States of America. For this reason, such findings may not be applicable to other developing countries such as Ghana, where the clinical settings and management may be different.

Cepeda et al. (2006) systematically reviewed the literature on the use of music for relieving pain. This review included all types of pain ranging from acute, procedural, cancer and chronic pain. It was concluded that music listening reduces pain and analgesic consumption, but the magnitude of these effects is small and thus, had vague clinical significance. Based on this premise, it was recommended that music should not be used as a first line management option for pain. Although the conclusions are quiet reasonable, this review is outdated (Kaveh et al., 2007) due to the publication of new studies that specifically report on the use of music in patients experiencing postoperative pain.

Another systematic review (Nilsson, 2008) was also conducted on the efficacy of music in relieving postoperative pain and other parameters such as anxiety and stress. This review limited the inclusion criteria to studies conducted between 1995 and 2007. The review concluded that: approximately half of the reviewed randomised controlled trials favoured the pain reducing effects of music while the rest were not in support of this. In the light of this, the author recommended some additional studies to be conducted in this area [ibid].

A recently published article in 2009 concluded that music can be used as an adjuvant for pain relief (Engwall and Duppils, 2009). This conclusion may not be fully supported considering the fact that the review included other non-randomised controlled trials (which are subject to biases). Moreover, the review included the combined use of music with other nonpharmacological interventions (such as jaw relaxation, therapeutic suggestion, guided imagery and so on) which creates difficulties in determining whether the outcomes is solely due to music or the other interventions. The review also used few databases (Blackwell Synergy, CINAHL, PubMed and Elsevier/ Science Direct) and restricted the review to studies conducted between 1998 and 2007.

Considering the publication of new randomised controlled trials that have reported conflicting findings (Allred, Boyers and Sole, 2009; Cooke et al., 2010; Ebneshahidi and Mohseni, 2008; Good and Ahn, 2008; Hook, Sonwathana and Petpichetchian, 2008; Sen et al., 2009) and the limitations identified in previous reviews, an updated version of a systematic review conducted on this topic will be of immense benefit. My review, therefore intends to include randomised controlled trials irrespective of the location, and will include only music as the nonpharmacological pain intervention. I will also expand my search strategy to include other databases and will not limit it to any year range since music is not an intervention that becomes outmoded with time and largely depends on an individual’s preferences.

Summary

In this section the background information and literature on the use of music in relieving postoperative pain has been provided. Moreover, the rationale

for the systematic has been thoroughly explained as well as the justification for the review question.

Chapter Two

Methodology

Once a research question has been shaped, it is useful to think about its type, as this will have an effect on what kind of research would provide us with the greatest quality evidence. The review question concentrates on music as a postoperative epain management intervention for patients after all kinds of surgery.

In providing the best evidence of effectiveness of an intervention, a systematic review is considered the most suitable way. This is because it summarises or draw conclusions from primary research on a specific subject, therefore increasing the number of subjects and enhancing the power to detect an intervention effect (Dickson, 2003).

This chapter will discuss the systematic review approach and evaluate its role in evidence-based practice. It then outlines the strengths and limitations of systematic reviews. Following this, a description of the procedural steps is given. Finally, the method used to conduct this review is discussed.

I

Definition of Systematic Reviews

Types of Systematic Reviews

Systematic Reviews Process

The Role of Systematic Reviews in Evidence-based Practice

In an era of evidence-based nursing, care providers need to base their clinical decisions on the preferences of patients, their clinical expertise, as well as the current best available research evidence relevant for practice (Beaven and McHugh, 2003; Mulhall, 1998; Sackett and Rosenberg, 1995).

Implications from the ever expanding volumes of healthcare literature (Beaven and McHugh, 2003) means that, it is impossible for a clinician to access, let alone understand, the primary evidence that informs practice (Glasziou, Irwig and Colditz, 2001; Handoll et al., 2008). As a result of this, useful research studies and valuable findings are concealed and abandoned as a whole (Beaven and McHugh, 2003). Systematic reviews of primary studies are therefore an essential aspect of evidence-based healthcare for practitioners who want to keep up to date with evidence in making informed clinical decisions (Lipp, 2005; Glasziou et al., 2001; Handoll et al., 2008; Schlosser/ FOCUS, 2010).

Commencing with a well-defined research question, such reviews utilise explicit methods to systematically identify, select, critically appraise, extract, analyse and synthesise data from relevant studies on a particular topic (Handoll et al., 2008; Petticrew and Roberts, 2006; Wright et al., 2007; Sackett et al., 2000). This process helps to minimise bias (Cook, Mulrow and Haynes, 1997), eliminate poorly conducted studies, confers power to the

results that may not be given to individual studies (Lipp, 2005) and thus provide practitioners with reliable, valid and condensed evidence (Glasziou et al., 2001) in a considerably shorter period of time (Mulrow, Langhorne, and Grimshaw, 1997). Systematic reviews may involve the use of statistical methods (meta-analysis) (Handoll et al., 2008) in estimating the precision of treatment effects (Egger, Smith and O'Rourke, 2001).

Unlike traditional narrative reviews, systematic reviews allow for a more objective appraisal of the evidence and may thus contribute to resolving uncertainty when original research, and reviews disagree (Egger et al., 2001). By using an efficient scientific technique, systematic reviews also can counteract the need for further research studies and stimulate the timelier implementation of findings into practice (Lipp, 2005). They can also inform the research agenda by identifying gaps in the evidence and generating research questions that will shape future research (Eagly and Wood, 1994; Handoll et al., 2008; Lipp, 2005).