KNOWLEDGE AND ATTITUDES OF HEALTHCARE PROFESSIONALS TOWARDS ELECTROCONVULSIVE THERAPY IN AFRICA- A SYSTEMATIC REVIEW

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DECLARATION OF STATEMENT

This work has not been previously accepted in substance for any degree and is not being concurrently submitted for any degree

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STATEMENT ONE

This dissertation is being submitted in partial fulfilment of the requirements for the degree of MSc Advanced Practice

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STATEMENT TWO

This dissertation is the result of my own independent work/investigation, except where otherwise stated. Other sources are acknowledged by footnotes giving explicit references. A bibliography is appended

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STATEMENT THREE

I hereby give consent for my dissertation, if accepted, to be available for photocopying and for interlibrary loan, and for title and summary to be made available to outside organisations.

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Acknowledgement

I dedicate the whole of this work to Almighty Allah (S. W. T) the creator of All, O Allah may your blessing be Upon our leader, Muhammad the opener of what is closed and the finalist of the previous, the helper of the truth with the truth and guide us to your straight path, and (also) upon his Prophet (Muhammad s) family, whose status is true and (whose) grade is great.

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Contents

Chapter one

Introduction

This section of systematic review will explore evidence regarding health care professional's knowledge attitude toward electroconvulsive therapy (ECT) in Africa. In this review of literature, the aim is to identify, analyse and synthesise information related to the research question thereby ensuring the best available evidence (Polit and Beck 2010; Parahoo 2014). This concurs with Rees (2011) who states the paramount purpose of systematic review is in terms of clinical implementation. However, Pearson and Evans (2001) identified some limitations such as potential reviewer bias and possible subjective issues within the systematic review process. So also, the possibility of risk in reviewer bias is said to be limited when authenticity is considered in terms of transparent appraisal, synthesis, rigour and justification of the available evidence in systematic review (Boland et al. 2014).

In research, hierarchies of evidences have been generated and rank the validity of the research in terms of strength and weaknesses in both primary and secondary research (Parahoo 2014). This hierarchy places systematic reviews at the highest level of evidences because of its gold standard due to provision of evidence based answers through investigation and justification from several primary studies (Boland 2014). Therefore, in answering the review question in this systematic review, a well define way and transparent steps will be employed/considered as an approach by the reviewer (Parahoo 2014).

Justification of the review and gaps in the literature

Alsharif (2013) defined gap in research as the missing elements or unanswered research questions in which the reviewer is trying to identify/highlight or even answer in the review process or approach. However, to identify the gaps in the literatures on the proposed topic,

a search was conducted of the following systematic review databases- Cochrane, Campbell, and Joanna Briggs Institutes (JBI) (2016) which identified no systematic review with regard to knowledge and attitudes of health care professional toward ECT in African countries. Purposely, this review will be designed to contribute, enhance and promote the evidence based clinical practices regarding health care professional knowledge and attitudes of ECT in African countries.

Background

Concept of ECT

ECT is defined as the intentional passage of small electric current through the brain of patient with mental illness, usually under general anaesthesia, to trigger fit/seizure (Mayo Clinic 2016). It is considered one of the most controversial treatment in mental health field worldwide (Royal college of psychiatrist 2016). However, Hersh (2012) highlighted some factors associated with these controversies such as fear, anxiety, faecal or urine incontinences, fractures of the small bones together with some temporary related effect experiences by most patient that underwent ECT procedure. In addition, these challenges or controversial issues were not only found among patient with mental illness but also among their relations, health care professional and even among lay public due to the nature of the early treatment patients were given high electricity doses without anaesthesia (Mayo Clinic 2016). Although, today research has shown ECT as being safe and effective in parts of the world like United Kingdom, USA, New Zealand and Australia where the modified type of ECT is being practiced due the advancement in the used of general anaesthesia (Lamont 2011) on the other hand, African countries still practice unmodified form of ECT because it costs

less money compared to modified form of ECT (Selis et al. 2008). Arshad (2007) reported lack of awareness and technological background as associated factors.

History of ECT

The origin of convulsive therapy began in the 16th century. Hungarian neuropsychiatrist called Ladisla J Meduna in 1934 who was considered the father of convulsive therapy introduced the use of drugs, Camphor and Cardiazole to induce seizure in patients with epilepsy and schizophrenia (Berrios, 1997; Mowbray 1959). Later, another neurologist, Ugo Cerletti from Italy saw how electric current is been applied to animals such as dog and pigs to be in a state of coma before slaughter when he visited an abattoir in Rome (Cerletti 1956). He proposed use of electroconvulsive therapy for conducting research on epilepsy. In 1938, he used the same idea to experiment on a confused person brought to his clinic by the police for the first time. Patient was given 11 treatments on alternate days for him to recover fully (Cerletti 1956). Cerletti (1983) name it as electroshock treatments and psychiatrists began to use the treatments in countries like Italy, Brazil France and it's use spread worldwide after the second world war.

Worldwide spread of ECT

Annually, it has been statistically estimated that about 1,000,000 people with psychiatric disorders undergo ECT procedure worldwide (Prudic 2001). ECT has become one form of treatment in mental health field in almost all continents (Swartz 2009) although with different variations in terms of usage/ clinical practices from one country or region to another (Gazdag 2009). ECT use became widely spread after the second world war as result of displacement of psychiatrists from European countries to most continents of the world including United State of America (Shorter 2009), Asia and Africa (Chang 2009), Western

Europe (Bolwig and Benbow 2009), Latin America, Canada/USA (Rosa and Rosa) and Russia (Nelson and Giagou 2009). The use of modified ECT become widely recommended in last decade as the accepted standard (Enns et al. 2010). However, despite the existing standards regarding ECT, Africa is among the world continents that still practices the unmodified type of ECT (Leiknes et al 2012).

Rate of ECT in developed countries

ECT use in UK has declined from 137,940 in the year 1983, to 105,466 in 1991 with an estimated number of 65,930 treatments conducted annually by 1999. In Wales, the number of patients who received ECT declined from 39 to 22 per 100000 between the year 1990 and 1996. Likewise, in USA ECT usage also declined from 58,667 to 31,514 between the year 1975 and 1980 (Eranti and Mcloughlin 2003). This decline in the usage of ECT is associated with public, patients and relatives stigma, myths, misconceptions and other related controversies due to the administration of unmodified types of ECT in the initial stage which was later replaced with the modified form using general anaesthesia and muscles relaxants which made it safer and effective (Mayo clinic 2016).

Guidelines regarding Electroconvulsive therapy

Webster (2005) identified ECT guidelines as the instructions or rules in which the ECT procedures should be carried out among patients with mental illness who receive ECT as a form of treatment. The following international agencies contributed to current ECT practice- the National Institute for health and care Excellence (NICE), Royal College of Psychiatrist (RCP), American Psychiatrists Association (APA) and the Scottish National Audit of ECT (SNAE). Main aim of these international agencies/ bodies is to make sure ECT procedure is safe, effective and adequate among patients with mental illness through the use of

standardised guidelines in the mental health field, thereby maintaining the evidence based practice (Royal College of Psychiatrists 2016). Royal College of Psychiatrists (2016) recommends health care professionals to abide by the Mental Health Act (2016) and consider the following before administering ECT:

- ECT should only be given if the condition is life threatening as a last resort when other treatments have failed or when not responding to other medications.
- Details of the associated risks with anaesthesia are documented.
- Special consideration should be given to pregnant women, young/older people and children

  medical comorbidities related to ECT.
- Risk associated with not given ECT before making any decision by the responsible health care provider by considering the latest guidelines.

Abiding by similar guidelines is mandatory in developed countries such as USA and Australia (Leiknes 2012). This is because the use of recommended guidelines support current evidence based practice by providing good quality of care which is safe and adequate among patients with mental illness. Whilst comparing to African countries these guidelines were not mandatory (Osman et al. 2015).

Indication/contraindication regarding ECT

Royal College of Psychiatrists (2016) outlines diagnostic/indications for patient with mental illness who is undergoing ECT procedure.

Indications

Major/severe depression

Severe/prolong manic disorders

Schizophrenia

Acute catatonia

Mood disorder with psychotic feature

Acute mania

Contraindications

Space occupying lesion within the brain

Brain tumours

Brain disease which lead to increase intracanal pressure

Diagnostic test and HCPs roles regarding ECT

Royal College of Psychiatrists (2016) recommends the following three steps of test while given ECT procedure.

Pre-test stage- before the procedure

At this stage, the common role by HCPs include emotional and educational support, pre-treatment planning and assessment together with proper explanation to the patient regarding ECT procedure before signing consent form. This is followed by these tests:

- Chest x-ray
- Blood tests
- ECG

Second stage- during the procedure: Procedure is given in a special set of room called “ECT suite” using Bargonic chair. At this stage ECT team will check the following

- Blood pressure
- Heart rate
- Oxygen saturation level
- EEG

If these parameters were found normal, the anaesthetist will administer anaesthesia together with muscle relaxants. Once patient is asleep, doctor will administer ECT and the fit will last between 20 to 50 seconds and there will be an ECG test during the seizure.

Third stage- Post procedure

Within the recovery room the nurse should take the following parameters:

- Blood pressure
- Oxygen saturation level
- Take away the mask, if any and
- Ask simple questions to see if the patient is fully awake.

ECT indication/administration and devices placement

ECT has been considered among patient with mania, catatonia major depression and schizophrenia (NICE 2009). Although, this varies from one country/region to another according to Shorter (2009). The commonest indications in USA were schizophrenia and affective depression (bipolar/unipolar) which constituted 72 to 92% of all patients receiving ECT whereas, in African countries psychotic disorders and schizophrenia were the commonest diagnosis or indication for 60 to 83% for patients undergoing ECT (Selis et al. 2008). This was supported by Kellner (2015) who reported ECT as effective and safe in treatment of some psychiatric disorders such as mania, schizophrenia and psychosis condition.

The procedure involves placements of electrodes thereby passing electric current to stimulate the brain hemispheres (Richard 2013). Although Kellner (2015) argues that the mode of action regarding this procedure is still unknown by scientists. It has been reported worldwide that preferred electrode placements was the bilateral type in which electrode were place by the sides of the head (Leiknes et al. 2012). This type of application of electrode bilaterally is associated with a common adverse effect of loss of memory but this is found to be more effective than unilateral electrode placement (Richard 2013). Despite effectiveness of bilateral electrode, unilateral form of electrode placement is considered as first choice in some countries like New Zealand and Australia (Lamont et al. 2011). But in Africa, there is no choices on the type of electrode device placement (Selis et al 2008) and decision is made by the team administering ECT.

Consent regarding ECT

Historically, informed consent has been rooted and considered in the social context and discipline of health professional, law, social and behavioural sciences and moral philosophy (Faden et al. 1986). Informed consent plays a paramount role in the field of medicine, especially in psychiatric field which deals with ECT procedures. ECT involves significant risk to patients, so consent is mandatory before undergoing any treatment/procedures thereby maintaining the dignity and right of a citizen (Breeding 2000). In UK, Mental Health Act 2007 details requirements for consent in section 58A for patients with mental illness who are undergoing any treatments/procedures either as inpatients or out patients in the psychiatric units. Patients who are detained under this act may decide to refuse ECT procedure but the Mental Health Act 2007 permits its administration to unwilling patients or patients who are unable to give consent or do not have next of kin or legal power of attorney if a consultant

psychiatrist together with another independent psychiatrist decides that ECT is in best interest of the patient. In addition, the Act also recommended that where next of kin will sign on behalf of patient, he/she must understand the risk and nature of the treatment before signing the consent forms (Mental Health Act 2007). In developed countries like United Kingdom, USA and Australia rules regarding consent are in place and usage is mandatory (Leiknes 2012). Whereas, in African countries due to lack of awareness by patient's relations and public in general, most relatives sign the consent form without knowing the associated risk of the procedures. Therefore, attention is needed regarding consent form information provided to patients and relatives which is the responsibility of health care professionals (Somoye et al. 2014).

Issues and controversies regarding ECT

Kellner (2011) described ECT as the second medical procedure in terms of number of controversies associated apart from abortion. This was supported by Bernardo (2015) who stated that for the past 80 years, ECT was controversial and even nowadays it is an issue of debate worldwide due to stigmatisation that surrounded it. The controversies and stigma were associated with the mode of action regarding ECT which is unknown by scientist (Kellner 2015). Other associated or contributing factors were related to adverse side effects such as fear and anxiety prior to the procedure. Nausea, vomiting, urinary or faecal incontinence and small bones fractures which patients may experience during the procedure. Memory loss and confusion are the commonest side effect after the procedures together with heart rhythm associated problems to some patients (Hersh (2012); Kellner 2015).

Knowledge of patients and relatives regarding ECT

Despite the effectiveness and safety of ECT procedure in psychiatric illness, Saran et al. (2011) stated that the public stigma and negative perception related to ECT procedures is associated with different negative views of both patients and their relatives. The finding of this study shows limitations in patient knowledge due to the inadequate information received prior to the procedure about adverse effects such as memory problems leads to less satisfaction among patients than their relatives (Saran et al. 2011). An important clinical implication regarding patients and their relative's knowledge on adverse side effects and associated risks is that clinicians and health care professionals dealing with these patients and relatives should give a proper explanation together with answering relevant questions about ECT procedure, thereby reducing the stigma and increasing the level of understanding and perception to ECT procedure (Saran et al. 2011). Subsequently, adequate knowledge as well as positive perception and attitude among patients and their relatives would be enhanced. Gass (2008) highlighted from his grounded study theory that nurse's responsibility in ECT units plays two roles:

i) Treatment role to the patients and

ii) Relational roles to both patients and their relatives

Thereby ensuring adequate information is given prior and after ECT procedure. Therefore, an appropriate and clear understanding of both patients and their relatives more especially on their knowledge and attitudes of the impact bored in their mind after ECT procedure is the core responsibility as well as fundamental role of nurses and clinician in ECT unit. This contributes in provision of evidence based support in effective treatment prior and after the procedure. This is supported by an ethnographic study conducted by Sercu et al. (2015) who

stated that support by nurses in psychiatric hospital plays a vital role in tackling stigma through proper counselling and understanding before undergoing any treatments such as ECT.

Attitudes regarding ECT

ECT has been reported safe and effective in the treatment of some psychiatric disorders (Kellner 2011). However, Eranti 2003 argue that ECT is still underutilised as a form of treatment in the mental health field. Whereas, recent study by Lieng et al. (2017) reported that ECT is still irreplaceable form of treatment as it relieves symptoms related to psychiatric conditions if guidelines were maintained. Several studies regarding patients, relatives and even health care professional have explored on attitudes toward ECT and their findings demonstrated variations in attitude. Outcomes of some studies were more positive especially those related to patients and their relatives while studies from health care professionals revealed negative attitudes toward ECT (Kheiri et al. 2010). Guloksuz et al. (2011) reported that the positive attitudes were found among the patient's relatives but not among patients themselves. Subsequently, Dong (2013) identified factors that contributes to negative attitudes such as consent related factors, lack of trained personnel, non-compliance and inadequate counselling skills by health care professional. This was supported by Zullino (2008) whose study showed 69% of patients received inadequate information about ECT with no idea of the convulsion involved, only 21% patients received adequate explanation. Therefore, proper explanation, education and awareness by health care professionals will play a vital role in developing positive attitudes and increasing knowledge of patients and their relatives toward ECT (Khein et al. 2010).

Summary of chapter one

In summary, this review introduction has described concepts regarding systematic reviews together with ECT background including historical aspect, current usage in developed countries and African countries. In addition, its mode of application/practices varies from one region or country to another (Shorter 2009). Guidelines in UK and applicable legal act is discussed in comparison with African countries. Consent and attitudes of patients and relatives are critiqued along with issues related to controversies to ECT were highlighted.

Chapter two

Dissertation protocol

Title

Knowledge and attitudes of health care professionals toward electroconvulsive therapy (ECT) in Africa: A Quantitative Systematic Review.

The Centre for review and Dissemination (CRD) highlighted the key areas to be considered while writing a protocol regarding a systematic review. In conducting a systematic review, a good protocol should be considered as a mind-map or draft plan, this should contain detailed information on study objectives, from the related review question, inclusion criteria, search strategy, study design, methods, quality assessment progressively up to the level of conclusion (Centre for review and Dissemination 2009). Therefore, it is paramount to draft a protocol which serves as a guide for the researcher/ reviewer to follow while undertaking secondary research such as a systematic review. Systematic reviews deal with the process of identifying, analysing, and synthesising of all available research studies regarding a topic to answer a research question (Parahoo 2014). Moreover, systematic review has been considered as a gold standard, as it deals with investigating several studies in a comprehensive process which usually minimises bias, thereby maintaining the validity of the study (Boland et al 2014). In view of this, if carefully carried out a good systematic review should follow a sequence manner starting from problem definition, assessment identification of all available evidences, finding synthesis then up to level of conclusion (Boland et al 2014). Following the above steps, the information gathered could often be

used by decision makers in the implementation of new policies or clinical decision regarding health care promotion or prevention (Webb and Roe 2007).

Purpose of the review

Question: What are the knowledge and attitudes of health care professionals toward Electroconvulsive therapy (ECT) in Africa?

Objectives

1. To systematically review health care professional's knowledge toward electroconvulsive therapy in Africa?
2. To systematically review health care professional's attitudes regarding electroconvulsive therapy in Africa?

In conducting a systematic review, formulating a concise and clear question is the first stage to consider (Bettany Saltivok 2012). In addition, while formulating a review question regarding this review, an acronym of PICO was used which stands for Population (health care professionals), Intervention (Electroconvulsive therapy), Comparison which is not applicable and Outcomes, respectively (Boland et al. 2014).

P	**I**	**C**	**O**
Population	**Intervention**	**Comparison**	**Outcomes**
Health care professionals (HCPs) within African Countries	Electroconvulsive therapy (ECT)	Not applicable	Myths and misconceptions together with adverse/side effects related to ECT such memory loss

Table 1

Background

Convulsive therapy began in 1930 when drugs were used to induce coma by Ladisla Meduna who was considered as the father convulsive therapy (Marrow 1959). Later, ECT therapy was developed by Ugo Cerletti in 1934 involving the passage of electric current which replaced the use of drugs (Cerletti 1934). ECT use became widespread after the second world war (Shorter 2009). Application were given in an unmodified form in which no muscles relaxants or anaesthesia given to the patients undergoing the procedures (Arshad et al. 2007). Despite the present day modified form of ECT procedures (with muscles relaxants), African countries still carry out the procedure in its unmodified form (without muscles relaxant) as noted by Selis et al. (2014). By implication, considering the nature of the procedure in which an electric current is being passed through patient which could result in significant physical and psychological adverse side effects like small bone fracture or temporary memory loss, review of existing knowledge and attitude of healthcare professionals towards ECT in African countries is needed.

An initial search was conducted using the following Databases: Joana Briggs institutes (JBI), Prospero, Center for Review and dissemination (CRD), Campbell collaboration library of systematic review, google search and systematic review of Cochrane database for existing systematic review in which only reviews from developed countries were found, but no systematic review was conducted from Africa with this research question.

Aim

To systematically review quantitative data related to knowledge and attitude of health care professionals towards electroconvulsive therapy in African Countries.

Objectives

Eligibility Criteria (inclusive and exclusion criteria)

Eligibility criteria are certain characteristics which the researcher considers before conducting a study as it determines the participant to be involved known as inclusion criteria or those to be excluded called exclusion criteria in primary studies (Polit and Beck 2014). However, regarding systematic review it deals with selection of relevant studies and exclusion of irrelevant ones which must be justified and clearly defined by the researcher (Bettany- Saltivok 2012). In view of this, relevant papers studies should be retrieved to answer the research question appropriately and to avoid selection bias (Jesson et al 2011).

Participants

In primary research, participants are the subject that could be included in a study, usually drawn from the population, whereas in secondary research such as systematic review it deals population that could be involved from several primary studies with same characteristic (Gerrish and Lathlean 2012). This review will focus on health care professionals who either directly or indirectly deal with electroconvulsive therapy procedures. Therefore, papers that include participants other than health care professionals will be excluded unless the data related to health care professionals is presented separately.

Intervention

Electroconvulsive therapy is broadly defined as the passage of small electric currents intentionally through the brain, usually done in either modified or unmodified form, to trigger a brief seizure to individual/patient with mental illness (Zullino 2008). The nature of

this treatments has drawn public, patients, their relatives and even health care professional attention due to related adverse effects, myths, misconceptions and some people even consider it as inhuman or torturing to the patient (Kerr 2001). Therefore, the reviewer will explore on electroconvulsive therapy which is the main intervention regarding this review.

Outcomes

Setting

This review will look at the studies conducted in African Countries on knowledge and attitude of health care professionals toward electroconvulsive therapy.

Type of studies

This review will consider all quantitative study designs including but not limited to randomized controlled trials, clinical trials, cohort studies, observational studies and before and after studies. On the other hand, the following will be excluded: anecdotal papers, papers that were mainly for discussion or letters, qualitative studies in any form of design or methodology together with published articles not written or presented in English language.

Search Strategy

In research, obtaining and identifying the best available data which is scientifically sound, can be achieved using appropriate or good searching strategy, especially in systematic reviews where several studies/papers will be reviewed (Boland et al 2014). In addition, gaining a search strategy to answer the research question, relevant key terms or their synonyms should be used to search the related articles/studies using different databases (Jesson 2011). In view of this, the following stages will be considered while undertaking the search process.

First stage

The search strategy aims to find published studies. A three-steps search will be utilized for each components of this review. An initial limited search of MEDLINE and CINHAL will be undertaken followed by an analysis of the test words contained in the title and abstract and of the index terms used to describe the articles.

Second stage

In this phase, relevant key words synonyms and index terms will be identified through the data bases by the used of subject headings to enable comprehensive search (Boland et al. 2014).

Stage three

Studies will be searched by the researcher manually from the reference list of the retrieved studies and journal articles. Moreover, experts may be contacted together with independent reviewers and personnel from mental health field in relation to ECT, who will be consulted for more advice and guidance for additional information when the need arises.

Databases to be used

JBI (2016) recommend the use of several databases during the process of search strategies in conducting systematic review. Subsequently, knowing the source of information and ability to access it through databases serves as requisites in considering evidence based research (Parahoo 2014). In respect of this, the reviewer will consider all the available electronic databases in the library that use mainly English language. These will include Medline, CINAHL, Cochrane, Scopus, Web of Science, Trip, BNI and Psych info data bases. Details together with search strategy information will be discussed in chapter three of this systematic review.

Method of the review

Study selection

In considering the genuineness and trustworthiness of quality papers regarding this review, key words, title and abstract will determine the articles to be involved in the study together with one independent reviewer which will be headed by the author in the review process.

Critical appraisal

In primary research, methods are certain strategies or procedure in which the researcher collect, analyse and interpret data (Holloway and Wheeler 2010). Whereas, in secondary research such as systematic review, prior to synthesise the findings, quality appraisal need to be initiated so that best available evidence can be identified (Boland et al 2014). In this review the Joanna Briggs Institute critical appraisal tools will be considered and used thereby evaluating trustworthiness of studies as recommended by JBI, as this will minimise bias, thereby maintaining the quality of the study (JBI 2016). In addition, a third reviewer may be consulted if there is an argument in the selection process of relevant articles, to minimise bias and enhance rigour in the study. Justification must be considered in the inclusion and exclusion of the articles that meet the criteria.

Data extraction

In conducting a systematic review, data extraction plays a significant role, as it deals with process of identifying and finally recording significant items from each study such as participants, outcomes, intervention and then the results of the relevant studies (Gerrish and Lathlean 2015). In respect of this review, the JBI (2016) data extraction tools will be used in extracting data from relevant quantitative studies.

Data synthesis

Data synthesis is the process in which the reviewer presents and summarises the information gathered from several included studies finding thereby answering the review questions (Ivon 2013). However, in conducting quantitative systematic review, meta-analysis or narrative synthesis can be used as recommended by Boland et al. (2014). In synthesising and summarising the available findings in this review, the reviewer will use a narrative approach.

Chapter three

Search strategy

In this section, systematically searching of evidences will be explored through the processes of search strategies as already defined in the research protocol. This is because searching processes enable the reviewer in selecting and screening the inclusive studies to be involved during the review process and excluding the irrelevant ones (Boland et al. 2014). It is a time-consuming process as it may require several attempts before searching with a definitive strategy (Dare 2008). It is considered the pivotal process due to rigorous and comprehensive methods it involves (Macnee 2004) and its impact on the outcomes. Therefore, to provide credibility and replication in its approach, the search need to be transparent and unbiased (Bryman 2008; Evans and Jones 2000). Thereby providing answers to the review questions as initially stated in the protocol.

In this systematic review, before attempting to utilise any search strategies from the available data bases, in the first stage, keys words related to proposed research question was broken down into its components parts. These include 'Electroconvulsive therapy', 'Health care practitioners' and 'Africa' which goes along with PICO Acronyms where Population (healthcare practitioners), Intervention (Electroconvulsive therapy), comparison (not applicable) and Outcomes (ECT myths and misconceptions and other adverse effects).

In the second stage the reviewer ascertained synonyms and related terms for the key words using Medical Subject heading (MeSH) which mapped the related terms automatically for easier usage (Boland et al. 2014) as shown in table 2. In the third stage, consideration was given to the related terms using (wild cards) such as an asterisk (*), ($) symbols or question

mark (?) which enable the reviewer to search part of some words. For example, Electroconvulsive therapy, therapist or therapies by using a single search word as (therap*) the (Boolean operators OR was used to widen/broaden the search of both related and synonyms word, whereas AND was used to minimise or narrow the search (Boland et al. 2014) as shown in table 3.

Table 2		
Population	**Intervention**	**Setting**
(1) "Attitude of Health exp Personnel"/	(27) Electroconvulsive therapy/	(39) ("Africa" OR Africa* OR Algeria OR Angola OR Benin OR Botswana OR "Burkina Faso" OR Burundi OR Cameroon OR "Canary Islands" OR "Cape Verde" OR "Central African Republic" OR Chad OR Comoros OR Congo OR "Democratic Republic of Congo" OR Djibouti OR Egypt OR "Equatorial Guinea" OR Eritrea OR Ethiopia OR Gabon OR Gambia OR Ghana OR
(2) exp Nursing Staff, Hospital/		
(3) nurs*.mp.	(28) electroconvulsive therap*mp	
(4) registered nurs*.mp.	(29) electroshock therap*mp	
(5) exp Health Personnel/	(30) exp Electroshock/	
(6) health professional.mp.	(31) electric* shock therap* mp	
(7) staff nurse.mp.	(32) electric*convulsive therap*mp	
(8) exp Students, Nursing/	(33) electric*stimulation therap*mp	

Table 2		
Population	**Intervention**	**Setting**
(9) health care support worker.mp.	(34) ect psychotherapy/electroconvulsive therapy	Guinea OR "Guinea Bissau" OR "Ivory Coast" OR "Cote dIvoire" OR Jamahiriya OR Jamahiryia OR Kenya OR Lesotho OR Liberia OR Libya OR Libia OR Madagascar OR Malawi OR Mali OR Mauritania OR Mauritius OR Mayote OR Morocco OR Mozambique OR Mocambique OR Namibia OR Niger OR Nigeria OR Principe OR Reunion OR Rwanda OR "Sao Tome" OR Senegal OR Seychelles OR "Sierra Leone" OR Somalia OR "South Africa" OR "St Helena" OR Sudan OR Swaziland OR Tanzania OR Togo OR Tunisia OR

Table 2		
Population	**Intervention**	**Setting**
		Uganda OR "Western Sahara" OR Zaire OR Zambia OR Zimbabwe OR "Central Africa" OR "Central African" OR "West Africa" OR "West African" OR "Western Africa" OR "Western African" OR "East Africa" OR "East African" OR "Eastern Africa" OR "Eastern African" OR "North Africa" OR "North African" OR "Northern Africa" OR "Northern African" OR "South African" OR "Southern Africa" OR "Southern African" OR "sub Saharan Africa" OR "sub Saharan African" OR "subSaharan

Table 2		
Population	**Intervention**	**Setting**
		Africa" OR "subSaharan African")
(10) exp Health Personnel/	(35) Shock treatment mp	
(11) psychiatric staff.mp.	(36) Ect treatment mp	
(12) ect nurse.mp.		
(13) qualified nurse.mp.		
(14) mental health nurse.mp.		
(15) doctors.mp.		
(16) exp Students, Medical/		
(17) exp Physicians/		
(18) exp Caregivers/		
(19) health caregivers.mp.		
(20) exp Psychiatry/		
(21) psychiatrists.mp. or Psychiatry/		
(22) medical personnel.mp.		
(23) health care providers.mp. or Health Personnel/		
(24) mental health staff.mp.		

Table 2		
Population	**Intervention**	**Setting**
(25) exp General Practitioners/		
(26) Combine 1 – 25 using OR Boolean.	(37) Combine from 27 – 36 using OR	
Total result of column 1 (26), column 2 (37) and column 3 (38) Were combine Using AND		

The systematic review search was performed in September and October 2016 using several databases which were searched by the reviewer. These databases are recommended and provided by the University electronic resources and include Medline, CINAHL, PubMed, British Nursing Index, Web of Sciences, Psych INFO, Scopus and Trip. However, searching through these databases usually requires training, skills and experience (Parahoo 2014). In view of this, librarian was consulted for advice and guidance by the reviewer thereby obtaining relevant and successful search results.

The table below outlines the systematic search strategy process using Medline database together with inclusive information on filtering methods, numbers of search terms with related key terms.

Table 3		
Medline database search no #	**Search terms**	**Results**
1	exp "Attitude of Health Personnel"/	135281
2	exp Nursing Staff, Hospital/	40718
3	nurs*.mp.	585051
4	registered nurs*.mp.	8223
5	exp Health Personnel/	431126
6	health professional.mp.	5737
7	staff nurse.mp.	1000
8	exp Students, Nursing/	19505
9	health care support worker.mp.	4
10	exp Health Personnel/	431126
11	psychiatric staff.mp.	160
12	ect nurse.mp.	1
13	qualified nurse.mp.	135
14	mental health nurse.mp.	375
15	doctors.mp.	58442
16	exp Students, Medical/	26013
17	exp Physicians/	111441
18	exp Caregivers/	26408
19	health caregivers.mp.	104
20	exp Psychiatry/	96769

Table 3		
Medline database search no #	**Search terms**	**Results**
21	psychiatrists.mp. or Psychiatry/	44540
22	medical personnel.mp.	4531
23	health care providers.mp. or Health Personnel/	47583
24	mental health staff.mp.	249
25	exp General Practitioners/	5055
26	1 OR 2 OR 3 OR 4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18 OR 19 OR 20 OR 21 OR 22 OR 23 OR 24 OR 25	1055666
27	Electroconvulsive therapy/	12125
28	electroconvulsive therap*mp	12908
29	electroshock therap*mp	442
30	exp Electroshock/	25265
31	electric* shock therap* mp	155
32	electric*convulsive therap*mp	69
33	electric*stimulation therap*mp	18648
34	ect psychotherapy/electroconvulsive therapy	12127
35	Shock treatment mp	1357
36	Ect treatment mp	330
37	27 OR 28 OR 29 OR 30 OR 31 OR 32 OR 33 OR 34 OR 35 OR 36	83426

Table 3		
Medline database search no #	**Search terms**	**Results**
38	(Africa or Africa* or Algeria or Angola or Benin or Botswana or Burkina Faso or Burundi or Cameroon or Canary Islands or Cape Verde or Central African Republic or Chad or Comoros or Congo or Democratic Republic of Congo or Djibouti or Egypt or Equatorial Guinea or Eritrea or Ethiopia or Gabon or Gambia or Ghana or Guinea or Guinea Bissau or Ivory Coast or Cote dIvoire or Jamahiriya or Jamahiryia or Kenya or Lesotho or Liberia or Libya or Libia or Madagascar or Malawi or Mali or Mauritania or Mauritius or Mayote or Morocco or Mozambique or Mocambique or Namibia or Niger or Nigeria or Principe or Reunion or Rwanda or Sao Tome or Senegal or Seychelles or Sierra Leone or Somalia or South Africa or St Helena or Sudan or Swaziland or Tanzania or Togo or Tunisia or Uganda or Western Sahara or Zaire or Zambia or Zimbabwe or Central Africa or Central African or West Africa or West African or Western Africa or Western African or East Africa or East African or Eastern Africa or Eastern African or North Africa or North African or	536564

Table 3		
Medline database search no #	**Search terms**	**Results**
	Northern Africa or Northern African or South African or Southern Africa or Southern African or sub* Sahara* Africa).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]	
39	26 AND 37 AND 38 refined using English language only.	15

To ensure thoroughness in the search strategy, same search was conducted from the remaining databases as mentioned above. See appendices 1, 2, 3 and 4 for more details.

In conducting this review, despite its quantitative aim, database search retrieved both qualitative and quantitative studies which according to Baross et al. (2003) allows researchers in not missing relevant studies during search strategies as type of study should not be considered by the reviewer. But aim of this review is to systematically review quantitative evidence, so all qualitative studies were excluded at the time of manual review of results from the search strategy.

So, certain issues related to location bias, publication bias and language bias were taken into considerations (Boland et al. 2014) because there is possibility of introducing publication

bias if the reviewer rely only on published articles (Jones and Evans 2000). Additionally, English language databases were used as the reviewer decided to use studies publish in English language only. However, both positive and negative findings of research articles should be considered to avoid risk of introducing language bias (Boland et al. 2014).

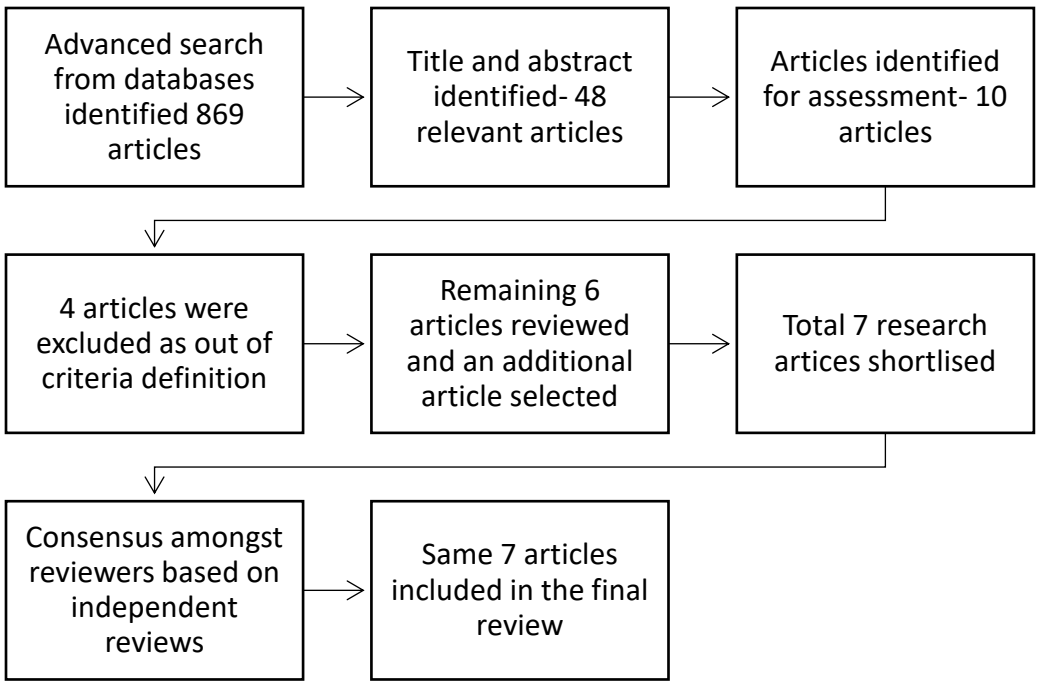
Following completion of the thorough and comprehensive search in this review, the reviewer also checked and read titles and abstracts of all the articles carefully as recommended by Boland et al. (2014).

Also, hand search was used to sort out all the relevant research articles that met the criteria. This is also supported by JBI (2016) recommendations which suggests incomplete search may result due to reviewer failure in using hand search from the retrieved papers. In addition, reference lists were scrutinised and checked to ensure none of the appropriate articles were missed. This is called 'back chaining method' as noted by (Jesson et al. 2011; Boland et al. 2014). Subsequently, to assess the methodological qualities of these studies another independent reviewer was consulted who agreed to assess all the papers, to ensure that appropriate studies are included as per the criteria.

Similarly, consensus has been reached by the primary and the independent reviewer about the relevance of studies retrieved as shown in tabular form below.

Table 4			
Data base	**Total no of references found**	**Retrieved based on references**	**Relevant references**
CINHAL	6	4	2
Medline	229	15	2
BNI	329	11	2
Cochrane Library	268	12	0
PsycINFO	11	5	1
Web of Science	4	2	1
TRIP	0	0	0
SCOPUS	22	1	0
Total	869	48	10

Figure 1



From the initial stage in this review, advance search from the recommended as well as international databases identified a total of 869 studies following thorough retrieval by references these resulted in 48 articles, this total were forwarded to the relevant reference after title and abstract search which resulted in 10 studies out of these 4 more studies were excluded as they failed to meet the inclusion criteria leaving the total of 6 studies. However, 1 more study was retrieved via hand search through references which gave the total of 7 papers that were critically appraised and then proceeded to data extraction process. See appendix 3 for search selection process follow chart for more details. Below is the summary of 7 studies included for critical appraisal:

Database name	**Authors, year and Primary research studies.**
CINHAL	Abbas et al. (2007) *Knowledge of and attitudes towards electroconvulsive therapy of medical students in United Kingdom, Egypt and Iraq: A transcultural perspective.* James et al. (2013) *Implementing modified electroconvulsive therapy in Nigeria. Currents status and psychiatrist's attitudes.*
Medline	James et al. (2009) *Nigerian medical student's attitudes to unmodified electroconvulsive therapy.*
British nursing Index	James et al. (2010) *Electroconvulsive therapy: A comparison of knowledge and attitudes of student's nurses and staff mental health nurses at a psychiatric hospital in Nigeria.* Oyewumi et al. (1994) *Electroconvulsive therapy in Nigeria: Psychiatrists attitudes, Knowledge and Skills.*

Database name	**Authors, year and Primary research studies.**
PsycINFO	James et al. (2009) *Nigerian medical student's attitudes to unmodified electroconvulsive therapy.*
Web of Sciences	Farrant et al. (1979) *Attitudes of Ugandan medical students towards straight and modified electroconvulsive therapy*.

Chapter four

Critical appraisal

The previous chapter explained how the strategy was conducted to source the available primary papers and how seven (7) papers were selected based on their quality and to enable inclusion into the review. In conducting a systematic review, critical appraisal is considered as a standardised way and core technique in which primary studies can be assessed systematically thereby supporting evidence based practise through the process of identifying and using best available research findings (Crewe et al. 2012).

Within this section, the decision and process in which selection of relevant studies will be performed, how the stages should be carried out and who should be involved as independent reviewers, will be discussed as per protocol. The main aim of critical appraisal is to ensure selection of relevant studies based on quality assessment, rigour and address the possibility of bias, to identify high quality papers that can be used in data extraction and synthesis (CRD 2009). Another advantage of critical appraisal is to identify if selected studies have included the PICO themes.

The JBI (2016), recommend the use of critical appraisal tools to assess the methodological quality of the study irrespective of its design either as qualitative or quantitative studies, as it helps in minimising the possibility of bias. Although, Polit and Beck (2010) argue that the occurrence of bias is “pervasive” and cannot be avoided completely. Moreover, Parahoo (2014) identify the possibility or risk of bias in all studies irrespective of its design. In view of this, bias serves as an influence which affect the trustworthiness and validity of the study (Polit and Beck 2014). However, for a reviewer to fully appraise the evidence in health care

intervention it is important to have full understanding of the concept or elements of bias as highlighted below by (Boland 2014; Parahoo 2014).

Boland et al. (2014) identified seven types of bias and their significance.

Element	**Meaning**	**Significance**
Selection bias	Refers to whether all subjects selected to participate in the study represent the target population. Which method being used in selection?	Ability to assess how the result will be transferable and generalisable to the target population.
Performance bias	This results when the investigators, participants and intervention providers or both were aware of specific group they were assigned to. As such were they blinded?	Ability to assess their awareness to the treatments, and if this could affect the study result.
Allocation bias	Refers to the way in which participants were allocated/assign to either treatments or control group.	It deals with study design, therefore the weaker the study design the more possibility or risk of bias.
Detection bias	This result people measuring the outcomes of the study were aware of treatments types received by the participants.	Ability to assess the study whether they were blind to the treatment, and if this could bias the study result.

Attrition bias	This occurs due to drop-out/withdrawal of participant proportion in the study. It could be due to various factors such as adverse effects or noncompliance.	This could affect the generalisability of the result if large proportion drop-out.
Funding bias	This usually occurs when organisation/bodies who funded the study give more emphasis on positive outcomes to a group.	Demonstrating interest on positive outcomes over one group may result in funding bias.
Reporting bias	Refers to the failure of the researcher to report the actual outcomes of the study, as already stated from the beginning. Is there reasons supporting the failure?	Failure to report the expected outcomes or fail to explain the reason of the failure may result in reporting bias.

Systematic review deals with synthesis and appraisal of related research question providing answers based on available evidence (Boland 2014). There is a need for the reviewer to have good understanding and skills of critical appraisal (Jones et al. 2011). This argument is supported by Jones et al. (2011) who discusses the "research practice-gap" which occurs due to inadequate knowledge, lack of understanding research papers, skills or ability to critique and synthesise literature by the reviewers.

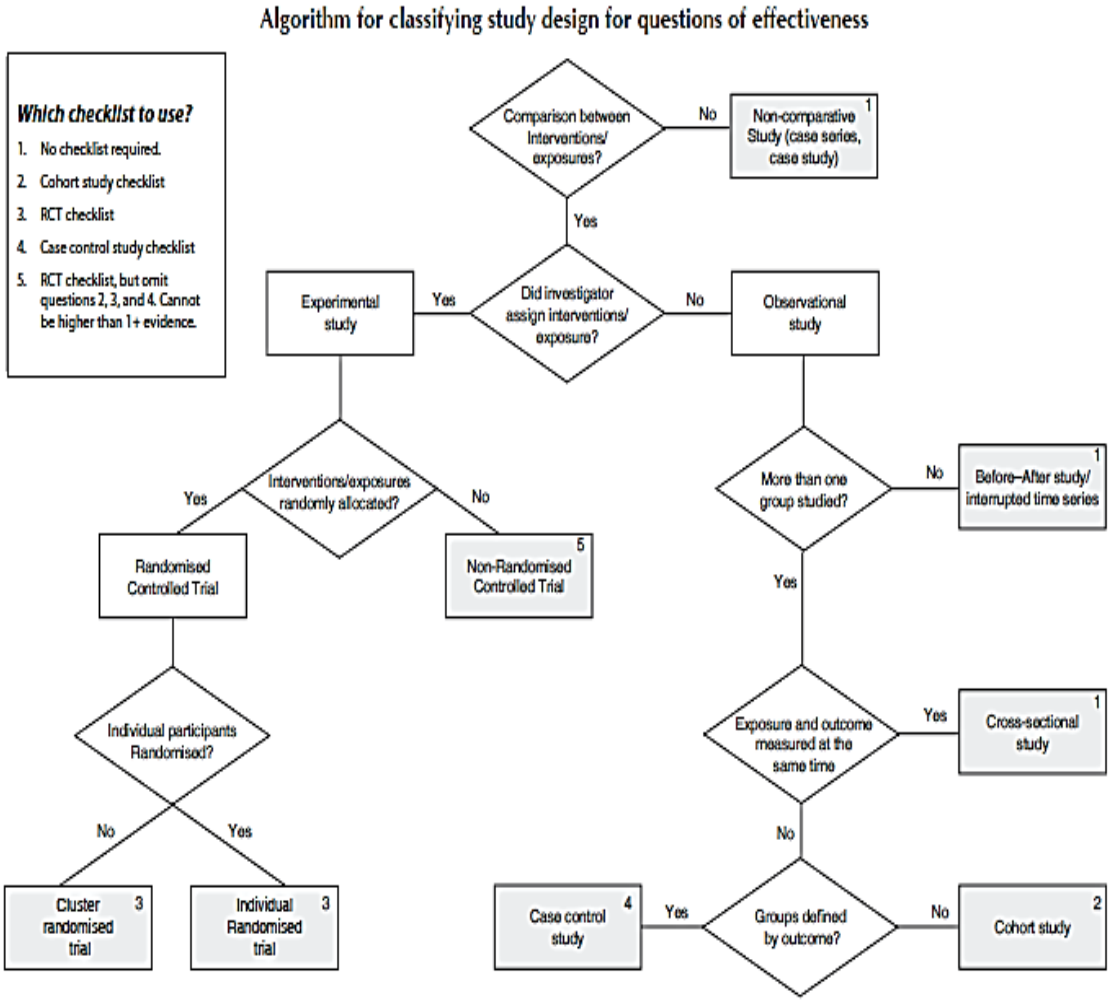
Critical appraisal tools

Critical appraisal as defined by Burls (2009) is the process by which the reviewer systematically and carefully examines primary studies thereby evaluating their values and trustworthiness in relevance to certain context. In respect of this several tools for assessing

the quality of study have been developed JBI (2016). However, some are suitable for more than one design, while others are appropriate for studies with multiple designs (Boland et al. 2014). This is supported by Crewe and Sheppard (2011) who show that 57% of critical appraisal tools may be applicable to more than one research designs, 25% of these tools mainly apply to experimental studies and 18% were designed for individual study. Similarly, Quigley et al. (2015) argue that no single approach has been designed for systematic review checklist, but recommended that reviewers should use the most appropriate and suitable checklist based on the study design. However, international research bodies such as the centre for the review and dissemination, Joanna Briggs Institute, together with Cochrane library have reached a consensus that standardized and validated critical appraisal tools should be used serving as a bench mark in selecting studies. In this review, JBI tools have been used as these are standardised and highest in quality in providing data analysis related to each study design/methods as recommended by the Cochrane Collaboration (Needleman et al. 2013).

Description of critical appraisal tools

The below chart of questions and effectiveness was recommended by the JBI (2016) because it provides adequate information on how to allocate appropriate critical appraisal tool as applicable to each study design.



In view of the above chart, the 7 retrieved studies were grouped under the following categories, six studies under observational and descriptive studies, and one experimental study as randomized controlled trial. However, to maintain the rigour and methodological quality assessment to each study, the reviewer employed and allocated relevant studies to a standardised and validated critical appraisal tool as recommended in the above chart (JBI 2016).

These critical appraisal tools include:

JBI 2016 critical appraisal checklist for observational and descriptive studies (See Appendix 6, 7 & 8).

JBI 2016 critical appraisal checklist for experimental studies (See Appendix 9).

Critical appraisal checklist for observational and descriptive studies

In considering the algorithm for effective questioning and classifying study design, as recommended by the JBI (2016), when the investigator did not assign intervention/exposure in the primary research it is known as an observational study. These include cohort study, cross sectional study and case control study. Four studies were cross sectional observational studies in which both the exposure/outcomes were measured at the same time, there was one cohort study and one case controlled study. Although, the observational/ descriptive checklist can be applied for the three above mentioned, the JBI (2016) provides a suitable checklist for each study irrespective of its design. For this reason, appropriate checklist has been used for both cross-sectional, cohort and case controlled study which contained question with certain criteria of yes, no, unclear and not applicable which determined whether the study met the inclusion/exclusion criteria.

For this appraisal, the reviewer has undergone a thorough appraisal process for the overall appraisal of the research evidence, this is because systematic review process incorporates critique purposely to assess the primary study methodological quality (JBI 2016). This can only be achieved by using appropriate appraisal tools, or when more than one reviewer(independent) is involved in the appraisal process (Boland 2014). In respect of this, the second reviewer blindly appraised the same articles using the same appraisal tools before reaching a consensus of the overall of the total seven studies. Due to agreement in their consensus on the total seven studies, a third independent reviewer was not required. For this review, completed appraisal sheet for RCT together with scored appraisal and score sheets for 4 observational/descriptive studies are is shown below.

Critical appraisal checklist for experimental study design (randomised controlled trial)

In considering the hierarchy of evidence, RCT is the most appropriate design if carried out properly as it minimises the risk of bias in terms of evaluating the effect of an intervention, so it is considered a gold standard in research (Polit and Beck 2013). Also, due to the highest evidence of experimental design RCTs are placed at 1st and 2nd level, whereas observational/descriptive studies fall under 3rd and 4th level of hierarchy of evidence because they are more prone to bias (CRD 2009).

As described, the JBI (2016) has recommended the use of appropriate critical appraisal tools to minimise study bias, and to assess the methodological qualities. These tools are designed in such a way that their questions determine the possibility of bias or quality of the study. For example, the below question number 1, 2 and 3 determine how the reviewer assessed the possibility of selection bias on whether the participants were randomly allocated to the group or not. In view of this, Farrant et al. (1979) randomly assigned 108 participants into 3 groups with equal number of 36 each who were blinded and concealed from allocator which support the avoidance of performance bias (Boland 2014). Below is a complete appraisal for RCT study.

The JBI (2016) critical appraisal checklist for experimental/randomised controlled trial studies

Author Farrant et al.	**Year** 1979			
Criteria	**Yes**	**No**	**N/A**	**Unclear**
1. Was true randomization used for assignment of participants to treatment groups?	Yes			

Author Farrant et al.	**Year** 1979			
Criteria	**Yes**	**No**	**N/A**	**Unclear**
The author randomly assigned 108 participants into 3 equal groups				
2. Was allocation to treatment groups concealed? *Each student from the 3 groups were given same written concealed introduction letter containing ECT information*	Yes			
3. Were treatment groups similar at the baseline? *The treatments groups were similar at baseline stage.*	Yes			
4. Were participants blind to treatment assignment? *All the participants from each group were given opportunity to observe both modified and unmodified/straight type of ECT which indicates blindness in the treatment*	Yes			
5. Were those delivering treatment blind to treatment assignment? *There is no information regarding blinding to those delivering treatments*		No		
6. Were outcomes assessors blind to treatment assignment? *No clear information regarding the above question in this study, therefore unclear*				Unclear

Author Farrant et al.	**Year** 1979			
Criteria	**Yes**	**No**	**N/A**	**Unclear**
7. Were treatments groups treated identically other than the intervention of interest? *The three groups were treated identically and there is no intervention of interest in this study*	Yes			
8. Was follow-up complete, and if not, were strategies to address incomplete follow-up utilized? *9. There is no clear information regarding complete follow up in this study*				Unclear
10. Were participants analysed in the groups to which they were randomized? *The 3 groups were analysed per randomised group, that is control group, pro-modified group and pro-unmodified/straight group, respectively*	Yes			
11. Were outcomes measured in the same way for treatment group? *The outcomes were measured same way as illustrated by the author in tabular form of each group*	Yes			
12. Were outcomes measured in a reliable way? *The author used reliable way to measure the outcomes by considering the chi-square test and t-test which were*	Yes			

Author Farrant et al.	**Year** 1979			
Criteria	**Yes**	**No**	**N/A**	**Unclear**
standard because it measures what it was supposed to measure (Parahoo 2014)				
13. Was appropriate statistical analysis used? *It was appropriate - used of chi-square and t-test*	Yes			
14. Was the trial design appropriate, and any deviations from the standard RCT design (individual randomization, parallel groups) accounted for in the conduct and analysis of the trial? *The design was appropriate by randomly allocating the participant into groups*	Yes			
Total score	10			

Following thorough appraisal methods in this review, four observational/cross-sectional studies scores are illustrated in the table below

Key = **1** – James et al. (2009), **2** - Abbas et al. (2007), **3** – James et al. (2010), **4** – James et al. (2013)

Criteria	**1**	**2**	**3**	**4**
Were the criteria for inclusion in the sample clearly defined?	Yes	Yes	Yes	Yes

Were the study subjects and the setting described in details?	Yes	Yes	Yes	Yes
Was the exposure measured in a valid and reliable way?	Unclear	Yes	n/a	n/a
Were objective, standard criteria used for measurement of the condition?	Yes	Yes	Yes	Yes
Were confounding factors identified?	Yes	No	Yes	No
Were strategies to deal with confounding factors stated?	Yes	Yes	Yes	Yes
Were the outcomes measured in a valid and reliable way?	Yes	Yes	Yes	Yes
Was appropriate statistical analysis used?	Yes	Yes	Yes	Yes
TOTAL SCORES	8	7	7	8

How the reviewer performed critical appraisal in this systematic review?

Systematic review is one of the core evidence in synthesising, analysing and evaluating the effectiveness of intervention. It involves a complex series of stages by which the reviewer/researcher must abide in order to maintain the rigorous process of the review (JBI 2016). With regard to this review, before the inclusion of each of the 7 articles, the primary assessor together with one independent reviewer critically appraised the primary studies synthesis and then finally reviewed interpretation of the findings. This was achieved by use of appropriate checklist as recommended by JBI which also helps in minimising the risk of errors or bias (CRD 2016). In addition, these tools comprise of four criteria of yes, no,

unclear and not applicable (N/A). This criteria serves as a guide in assessing the quality of the study by giving a point for scoring yes response before the overall inclusion of the 7 appraised studies (Higgins et al 2011).

To identify the best quality studies with the highest evidence, the JBI critical appraisal tools questions were grouped into either essential or desirable. These questions play a vital role in robust study assessment as highlighted by DARE (2009). This was supported by JBI (2016), as it enables the researcher to choose the best available articles and findings as supporting evidence for any proposal to change the practices. For example, in respect to this review, an assumption is that by proposing changes to any negative attitudes (if found) about ECT in African health care professionals, subsequent changes could be initiated after attitude change to a more positive one. This is relevant in context of African countries where no set of guidelines are being considered in the administration of electroconvulsive therapy. Therefore, consideration is also given to both essential and desirable questions but not just essential questions, together with total scores of each identified study in this review.

Strengths and weaknesses of the included studies

In conducting systematic review, scoring system regarding included/excluded studies play a pivotal role in assessing the included studies methodological quality in the appraisal (Tarwee et al. 2011). This scoring system question varies from one checklist/tool to another as the study design also varies. This is because some are descriptive while some are experimental in nature. However, irrespective of any checklist/tool or designed use, the JBI (2016) recommends some essential questions to be considered in conducting review. For instance, in observational/descriptive studies question 7 “were the outcomes measured in a valid and reliable way?” and question 8 “was appropriate statistical analysis used?” varies in

experimental studies design by appearing as 11 and 12. These essential questions highlight validity and reliability of the studies. Due to lack of similarity in terms of study design and quality, it was agreed based on consensus that questions 1, 4, 6,7,8 and 10 for experimental studies should be met (as minimum criteria) before inclusion. In addition, in this experimental study design, any score of 7 and above should be considered. In view of this, Farrant et al. (1979) met the essential criteria and scored 10, therefore included in this review. On the other hand, observational studies are prone to bias due to their level in hierarchy of evidence (CRD 2009). Therefore, by considering the nature of total of 8 questions, it was agreed that in assessing the quality of observational/descriptive studies, a total score of 6 and above is needed for a study to be included. Based on these criteria, all 6 studies met up with essential criteria and scored 6 and above. Although, there are some possible queries regarding the cohort study by James et al. (2009b) with regards to incomplete follow up. However, author has addressed this in the paper and this resulted in a total score of 6 and the study was included.

Six studies out of seven are observational studies/descriptive studies which are included in this review- out of which four cross-sectional studies: James et al. (2010), Oyewumi and Kazaria (2004); James et al. (2013); James at al. (2009); 1 retrospective study of Oyewumi et al. (1994), and 1 prospective study by Abbas et al. 2007) and the remaining one is an experimental study which was conducted as a randomised controlled trial by Farrant et al. (1979).

The six-primary observational and descriptive studies
Abbas, M., Mashrai, N. and Mohanna, 2007 *knowledge of and attitudes towards electroconvulsive therapy of medical students in United Kingdom, Egypt and Iraq: A transcultural perspective. Journal of ECT.* 00 (00) P. 1 – 5.
James, B. O., Lawani, A. O., Omoaregba, J. O. and Isa E. W. 2010 *Electroconvulsive therapy: A comparison of knowledge and attitudes of student's nurses and staff mental health nurses at a psychiatric hospital in Nigeria. Journal of Psychiatric and mental health*. (17*)*. P 141 – 146.
James, B. O., Omoaregba, O. J., and Olotu, S. O. 2009 *Nigerian medical student's attitudes to unmodified electroconvulsive therapy.*
Oyewumi L. K. and Kazaria S. S. 1994 *Electroconvulsive therapy in Nigeria: Psychiatrists attitudes.*
James, B. O. and Inogbo, C. F. 2013 *Implementing modified electroconvulsive therapy in Nigeria. Currents status and psychiatrist's.*
James, B. O., Omoaregba, O. J., Igberase, O. O., and Olotu, S. O 2009 *Unmodified electroconvulsive therapy: Changes in knowledge and attitudes of Nigerian medical students. African Health Science* 9 (4) P 279 – 283.
Experimental study (Randomised controlled trial).
Farrant, J. L., and Farhoumand, N. 1979 *Attitudes of Ugandan medical students towards straight and modified electroconvulsive therapy*. *Medical education, Department of psychiatry, Makarere University, Kampala Uganda*. P 17 – 22.

Summary of chapter four

This chapter has described the methods as well as the process through which the 7 identified papers were included in this systematic review. In addition, it explored the seven types of bias and how bias can be detected as highlighted by Boland (2014). The reviewer also applied/used the most recent and appropriate critical appraisal tools which as recommended by the JBI (2016).

Chapter five

Data extraction and synthesis

Section four examined how the review processes occurs using appropriate critical appraisal tools as recommended by JBI (2016) in which 7 studies were identified for inclusion thereby maintaining rigours which then progressed in to data extraction and then data synthesis in this review.

This chapter will discuss the data extraction process findings and progress to narrative synthesis. In addition, discussion about of validated tool to be used in this review is noted, as this will enable in data synthesis. Boland (2014) defined data extraction as the process by which all necessary/relevant data identified from the included articles are combined into a single format also known as data extraction form. The main reason for data extraction is to generally describe the included primary studies results systematically and consistently from the information of the appraised articles based on their quality which is then used for data interpretation. As data extraction deals with selecting and recording of relevant information from the primary studies, this task is some time prone to errors either by extracting too much/too little which usually results in waste of time or effort (Dykier 2016). Therefore, to overcome these errors and difficulties the CRD (2016) and JBI (2016) have addressed this area.

In conducting systematic review, Dykier (2016) suggests that reviewers should apply the following steps as these play a paramount role. The steps include use of standardised/validated data extraction form, involvement of more than one person in the process of data extraction and recording exactly the data as reported from the primary

sources, for instance 65% of male psychiatric nurses, instead of calculating the number of male psychiatric nurses from the sample. However, having extracted the relevant information from the process of data extraction, it is advantageous to report them in a clearer and understandable way to follow the thought through the process of data synthesis (Boland 2014).

Data synthesis

Boland (2014) identified data analysis as the process by which reviewers break down the findings extracted from the data which usually progress into synthesis/manufacturing new information by the reviewer. However, despite the subjectivity in the process of narrative synthesis compared to meta-analysis, it is noted that its approach tends to be transparent, rigorous, unbiased and errors can be minimised if carefully carried out (Champatana 2004). Among the included studies are 1 randomised controlled trial by Farrant et al. (1979), 6 observational/descriptive studies, out of these 4 were cross-sectional studies (James et al. 2009, Abbas et al. 2007, James et al. 2010 and James 2013), 1 observational cohort prospective study (Oyewumi 1994) and 1 retrospective observational study (James et al. 2009). The nature of these studies showed heterogeneity. Therefore, knowing the level of heterogeneity from the included studies, plays a paramount role as it determines the use of narrative synthesises which depends upon the reviewer's decision or judgement (Connor et al 2016).

Data gathering

Data gathering in systematic review is the process by which all primary data collected from each individual study is combined using a single form for easy extraction and synthesis of their findings (Basavanthappa 2007). Several tools can be used for gathering data (Munn

2014). Although, Elamin (2009) argues that in all circumstances there is no single approach or considered gold standard irrespective of each tool been used for data extraction in conducting systematic review, as there are certain limitations. Elamin (2009) further emphasises to potential reviewers to consider data complexity, volume, numbers, location, and also to include careful selection of appropriate tool for data extraction, planning and then piloting. However, Munn (2014) suggests that in a well-designed systematic review, the standardised as well as validated form for data extraction as recommended by the Cochrane collaboration and JBI (2016) should be used by the reviewers as it contains all the relevant information in answering the review question. which goes along with PICO components (Bettany-Saltivok 2010). Moreover, standardised data extraction form should be considered based on the need of the reviewer research design, but its contents should include general information of both authors, title, types and years of publication, characteristics of the study participants, design outcomes, both authors and reviewer's comments, other included outcomes measures such as effect size, statistical test and authors description (Dykier 2016).

Prior to the data extraction in this review, piloting of two studies were carried out by the reviewer. This was supported by Boland (2014) who suggests one or two studies piloting should be conducted when extracting four to five studies, and when it involve more than 15 studies at least 5 or 6 studies need to be piloted prior to the commencement of data extraction. Data extraction plays a pivotal role because most studies were reported using different format/styles, so there is a need to point out main data element of interest, provision of standardisation which usually help in recognition and analysis. This can be achieved by the use of an appropriate tool as recommended by the JBI (2016). In respect of this review, the recent JBI (2016) data extraction form for observational as well as

experimental studies have been employed and used for each individual study. Ideally, two experienced researchers should independently and blindly perform data extraction before any correlation or any amendment of the finding (CRD 2016 and JBI 2016). In a tabular form below an example of 1 observational study by James et al. (2013) is shown.

JBI data extraction tool for observational cross-sectional study

Author, Date and study title	James, B. O. and Inogbo, C. F. 2013 *Implementing modified electroconvulsive therapy in Nigeria. Currents status and psychiatrists' attitude.*
Method	Cross-sectional
Setting	Multicentred (20 out of 28 centres in the county)
Participants/subject	Total of 76 psychiatrists and trainees with not less than 18-month experience on electroconvulsive therapy duration range between 2 to 35 years
Intervention	Electroconvulsive therapy
Statistical analysis	Data was analysed using SPSS version 16 but summarised using descriptive statistics
Authors comment	The study was cross-sectional design on psychiatrist attitude on implementing modified ECT. Despite the shift in the opinion, half of the respondents disagree with statement that ECT is safe and effective, additionally their attitude was negative towards ECT.
Reviewers/extractors comments	This study may have benefited if validated/standardised questionnaire was used or if carried out in the whole 28 major centres in the country instead of 20 centre.

Several tools have been developed for data extraction (Jahan et al. 2016). However, in considering the 7 appraised/included studies from the previous chapter which falls under experimental as well as observational/descriptive studies, emphasis was given to the JBI (2016) tool- Meta-analysis of the Statistical Assessment and Review Instruments (MAStARI) was used for experimental (Randomised/non randomised controlled trial), observational and descriptive studies (Cohort, case controlled and case series) as it the most recent and standardised tool (CRD 2009). By using the validated as well as appropriate tool, errors and bias were minimised thereby providing result reliably and consistently (JBI 2016; CRD 2009 and Jahan et al.2016).

Long (2016) recommends reviewers to conduct routine piloting prior to the commencement of the actual data extraction process. An advantage of this is to reduce the risk of errors, and increase the validity of the review (Boland 2014). Both the primary assessor and second assessor have agreed to used JBI MAStARI for the included papers, and any issues raised were resolved through discussion with second reviewer, hence there was no need for a third reviewer to be involved.

Dykier (2016) identified narrative and meta-analysis as the two ways by which data can be synthesised/analysed irrespective of any study type or design. Meta-analysis can be applied/used if the study characteristics such as population, study design, intervention statistical test and outcomes tend to be the same (homogeneous), or when dealing with large number of studies that require computer trouble coding and statistical calculation (Higgins et al. 2011). On the other hand, narrative synthesis can be used if the included primary studies characteristics differ, also known as (Heterogeneous) or when small number

of studies are included (Dykier 2016). Due to the variation of the included studies a narrative approach will be used.

Studies description

Description of the study plays a significant role in conducting systematic review, as it provides detail/comprehensive information of the primary studies included, appraised and extracted studies by reviewing question which goes along with PICO themes such as setting/population characteristic, study design, intervention and outcome measures (Jahan 2016; Boland 2014 and Dykier 2016).

Studies setting

In systematic review, setting refers to a place or geographical location where the primary studies have been conducted (Boland 2014). The focus in this review is to consider primary studies undertaken in African countries, although 1 transcultural study by Abbas et al. (2007) was conducted in three countries United Kingdom, Iraq and Egypt, this study was included but only the results from Egypt considered. Whereas, the remaining 6 studies were carried out within Africa. However, the following factors tend to affect the setting of these primary studies- differences in cultures and resulting psychosocial make up, healthcare system, and variations in level of technological advancement in some settings. This has resulted in lack of similarities in these settings which is said to be heterogenous in nature.

S/n	**Stud**	**Setting**
1	James et al. (2009)	Nigeria
2	Farrant et al. (1979)	Uganda
3	James et al. (2013)	Nigeria
4	Abbas et al. (2007)	United Kingdom, Iraq and **Egypt**

5	Oyewumi and Kazaria (1994)	Nigeria
6	James et al. (2010)	Nigeria
7	James et al. (2009)	Nigeria

Study design

Study design as identified by Jaypee (2011) simply refers to the plan which researchers consider/follow in conducting research. In conducting well designed systematic review, identification of study design is one of the steps which should be considered by reviewers (Boland 2014). Reason behind this is to help in assessing the quality of the study by choosing appropriate tool and identification of different variation among studies (Curius 2016). In considering the basic type of study design, 6 of these were observational and 1 was an experimental study. Out of the 7 studies, there is 1 experimental study of RCT in which participants were assigned into three groups with the aim of recording medical student's attitudes on straight or modified ECT. There is only one retrospective study with two consecutive online mailing follow up, there are four cross-sectional studies in which the intervention is one off within the defined population (Kichenham 2004). This shows how study design differed for the 7 included studies, for instance random allocations in RCT, although no detailed description of concealment, some are follow up studies and other is cross -sectional in design which indicates differences in design or Heterogenousity. The table below shows more differences regarding study design.

Study	**Basic type**	**Design**	**Short comment**
James et al. (2009), Abbas et al. (2007),	Observational	4 Cross-sectional studies	All the four studies conducted it cross-

Study	Basic type	Design	Short comment
James et al. (2010), James et al. (2013).			sectionally that is once open a time not longitudinal.
Oyewumi and Kazaria (1994)	Observational	1 retrospective case controlled study	Groups were defined by outcomes
James et al. (2009)	Observational	1 prospective cohort	Groups were not defined by the outcomes
Farrant et al. (1979)	Experimental	1 Randomised controlled trial	Randomly allocates participants into 3 groups namely the control group, pro-straight group and pro-modified group.

Population characteristics

Population in research refers to the group of people who consented and voluntarily agreed to participate or involve in a particular study (Greenough 2013). Population is one of the major aspect to consider in data extraction, as it defines those who participate in the study, by identifying their characteristics such as age, gender, ethnicity, socio economic status and

characteristics of the diseases or treatment intervention, if any, according to Dykier (2016). From the 7 included studies, all identified the participants' professional characteristics either as medical student, nurses or psychiatrist trainees. Studies have also mentioned number of participants, age range together with gender although only 5 out of 7 included studies have identified gender of participants. However, none of the included studies identified ethnicity despite cultural diversity within African countries. Abbas et al. (2007) is the only study which compared the transcultural perspective in Egypt, United Kingdom and Iraq. In this review, these characteristics of HCP being the participants is fully described in tabular form below.

Study	**Participants (HCP)/professional characteristics**	**Number of participants**	**Mean age**	**Gender**
Farrant et al. 1979	Medical students	108	From 18 and above	Not specified
James et al. 2009	5 years' medical student	72	23 and above	Not specified
Oyewumi and Kazaria 1994	Psychiatrist and trainees	70	27 – 69	Males 69 Females 1
Abbas et al. 2007	Medical students	339 **(85 from Egypt)**	Mean age in SD (23 [1.3] years)	Nearly equal number in **Egypt**

James et al. 2009	Medical students	180	Mean age 23.5- 1. 8 years	Male 53.6% Female 57.4%
James et al. 2010	Mental health nurse staff and students	135	<20 - > 50	Male 34 Female 101
James et al. 2013	Psychiatrist and trainees	76	Mean age 25 – 65	Male 49 Female 27

Intervention

In research studies, intervention simply refers to the treatment or therapy which the researcher wants to assess (Boland 2014). Some studies may have multiples interventions, while some research a single type of intervention/therapy (Parahoo 2014). For example, ECT being an intervention in this review, Farrant et al. (1979) compared straight type of ECT to a modified one. James et al (2013) considered psychiatrist's attitudes in implementing modified ECT, whereas James et al. (2009) assessed medical student's attitudes to unmodified types of ECT. The above-mentioned 2 studies show variations in attitudes towards both modified and unmodified form of ECT. Despite the differences in the participants, the intervention also seems to be different. For instance, attitude of psychiatrics in implementing modified form of ECT, the commonest indication as stated by the respondents included catatonia, schizophrenia, major depression and puerperal psychosis and most respondents had inadequate knowledge and required an update of knowledge. Participants also believed anaesthesia plays a vital role in minimising common adverse effect such as loss in memory and urinary or faecal incontinence. Whereas, James

(2009) identified the following solution in shaping the attitudes towards ECT- follow-up of patients during clinical rotation and attending lectures periodically. Therefore, due to these variations in ECT intervention, there is no homogeneity and as such meta-analysis is not appropriate.

Outcomes Measures

Boland (2014) define outcomes as any adverse effects or positive measures which can be health-based outcomes, it can be objective or subjective, identified either through methods of data collection quantitatively, or in the process of thematic analysis. In references to this review, the commonest outcomes identified for ECT were safety and efficacy which shows no homogeneity. Moreover, since the participants, intervention, methodologies and studies design were not similar they could not be compared. In addition, due to differences in the studies design either as experimental or observational, these 7 included studies used different form of statistical analysis. For instance, Farrant et al. (1979) used student t test, and chi-square test for his experimental study. Whereas, for the 6 observational studies conducted by James et al. (2009), Abbas et al. (2007) James et al. (2010), Oyewumi and Kazaria (1994), James et al. (2013) and James (2009) used either of the following student t-test, chi-square, 2 tails Fisher exert test, Kruskal-Wallis test, Spared sample t-test or descriptive statistics.

Narrative synthesis

As described in the protocol of this review, the narrative approach will be used in reporting the extracted data from the PICO components. This method is employed because narrative synthesis serve as a guide in reporting multiple primary study findings when they are

heterogenous in nature, so it focuses on synthesising evidence from multiple range of questions not specifically to those in a particular intervention (Popay et al. 2006).

Narrative synthesis in this review

Boland (2014) defined narrative synthesis as the process by which reviewers present the results or findings from several/multiple primary studies using words from the extracted data. However, Denberg (2013) argued that different ways can be applied by the reviewers in synthesising studies results from the primary papers. Since narrative synthesis serves as the "key concept or element" in conducting a systematic review, its main aim is to bring together the results of the included papers based on evidence to draw a written conclusion by the reviewer (Popay et al. 2006). In considering the lack of similarities or heterogeneity in terms of study design and methodologies as presented in the data extraction tables, it is the responsibility of the reviewer to highlight how the extracted and gathered data will be presented using narrative synthesis in a review. This is supported by Boland (2014) who states that in the process of narrative synthesis, reviewers should identify how they will narrate/report their results whilst using a clear language and in an understandable way. This can be achieved through answering the review questions and presenting the data in tables using the headings from the original question using PICO. In this review, consideration was given to the above tables which are based on PICO so that answering the review question will be done in an understandable manner through narrative synthesis.

For this review, considering the nature of the review questions which include knowledge of HCPs towards ECT in African countries and attitudes of HCPs regarding ECT also in African countries. This resulted the reviewer to consider each objective as a separate theme and narrate it separately, so that it enables easy understanding and clarification. In view of this,

all the included studies that examined HCPs knowledge will be considered as knowledge theme, whilst those for HCPs attitudes (attitudes theme) and those related to outcomes will be treated separately.

Knowledge of HCPs theme

As described above, the following four studies out of 6 examined the health care professional knowledge regarding ECT. Despite the variation in studies design, population characteristics, setting as presented in the above, these four studies (James et al. 2010, Oyewumi and Kazaria 1994, and James et. al 2009b) three of these studies identified increase in the theoretical knowledge toward ECT for 91.2%, 74.2%, and $P < 0.022$. which ware statistically significant with exception of Abbas et al. (2007) who noted inadequate knowledge regarding ECT 17% ($P < 0.0\ 470$), respectively.

Attitudes of HCPs theme

From the respondent's attitudes regarding ECT, all the 6 observational studies together with one RCT reported attitudes of the respondents. Oyewumi and Kazaria (1994), James et al. (2009a), James et al. (2010) and James et al. (2013) reported positive attitudes towards ECT as being favourable (80.5%), beneficial ($P < 0.017$) 70.7%, effective ($P < 0.001$) 61.1%, and 69.7% respectively, all of which were statistically significant. However, negative attitudes were also reported to those who consider unmodified ECT as outmoded, hazardous and more dangerous as identified by (Farrant et al. 1979 and James et al. 2009b) with 86% and ($P < 0.001$) 64.5%. whereas, 46 (54%) respondents from Abbas et al. (2007) reported don't know regarding attitudes toward ECT.

Other outcomes themes

Despite the heterogeneity in the population, setting and design from all the seven included studies, most studies reported outcomes that were similar from their studies. In view of this, those outcomes will also be considered into separate theme in order to identify their statistical significance. These common outcomes reported by most studies include; myths and misconceptions related to ECT such as causes brain damage, ECT is painful, ECT should only be used as last resort, ECT causes adverse effect, ECT is dangerous and ECT is inhuman.

From the respondent's perspective on whether ECT is being misused/overused, out of 7 studies, 4 studies (James et al. 2009a and James et al. 2010) reported ECT as being misused with highly significant values of $p < 0.001$ and $p < 0.0001$. However, James et al. (2009b) disagreed with this statement with $p < 0.00357$. Whilst Abbas reported no idea on whether ECT is been misused or not with 54%. While the remaining three studies reported no information regarding this statement.

Regarding ECT adverse effects and should only be used as last resort (Oyewumi and Kazaria (1994) and James et al. (2009b) identified ECT causes slight/permanent brain damages to some patients according to 61.3% respondents and $p < 0.002$ which was statistically significant. Although, James et al. (2009a) and James et al. (2013) disagreed that ECT causes brain damage 81.1%, and 63.2% which were statistically significant. On the other hand, ECT should only be used as last resort, two studies reported that ECT should only be used as last resort when other treatments failed or when patients are not responding to other medications although their report varies as James et al. (2009a) agreed with 78.7% while Oyewumi and Kazaria (1994) disagreed with 80.6%. Whereas, Abbas et al. (2007) is the only study who reported ECT causes death with value of 52%.

From the ECT myths and misconception out of 7 included studies, 2 reported same statement- ECT is being painful and dangerous to the patients therefore should be discontinued. James et al. (2009b) agreed with this statement that ECT causes pain ($P < 0.001$) while James et al. (2009a) disagree with 85 (51.2%). However, from those respondents who perceive ECT as dangerous, respondents from James et al 2013 consider unmodified ECT as safe (51.3%) Whereas, Farrant et al. (1979) James et al. (2009a) reported unmodified ECT as dangerous $p < 0.001$, 64.5% which were statistically significant. This goes in contrary with Oyewumi and Kazaria (1994) who disagreed that ECT should be discontinue (80%). In this statement, Abbas et al. (2007) reported no idea on wither ECT is dangerous or not.

With regard to ECT guidelines three studies reported need to consider explicit ECT guidelines for patients undergoing ECT procedure these includes (Oyewumi and Kazaria 1994, James et al. 2013 and James et. al. 2010) 76.4%, 55.2% and 85% all of which were highly statistically significant.

Summary of chapter five

This chapter has examined and identified the process of data extraction. Similarly, extensive reading was carried out of each individual primary study to extract the relevant information related to population, intervention, study design and setting. The studies show heterogeneity that led the reviewer to present the findings in tabular as well as narrative form. Subsequently, the next chapter will consider the process of data synthesis and how it will be presented in narrative form.

Chapter six

Discussion of findings

In research, discussion of finding play a paramount role as it involves discussing the result findings of the included studies which usually follow after the data has been extracted and narrated. However, it the responsibility of the reviewer to develop an idea on how to discuss his findings for easy interpretation, also by giving consideration in terms of similarities and differences of the included study's findings in a wider range by comparing it to other literatures (Boland et al. 2014). The focus of this systematic review was to identify relevant quantitative studies based on available evidence from the studies conducted in African countries in respect to health care professional knowledge and attitudes regarding ECT.

The main objective of this review was to:

i) To systematically review health care professional's knowledge toward electroconvulsive therapy in Africa.

ii) To systematically review the attitudes of health care professional's attitudes regarding electroconvulsive therapy in Africa.

Discussion of findings in this review will follow same pattern as cross-cutting theme regarding knowledge, attitudes and other outcomes for easy interpretation as presented in narrative synthesis from the previous chapter. Despite the heterogeneity in methodological quality design in terms of population characteristic, setting and variation in outcomes of the four included studies that reported on theoretical knowledge regarding ECT, (James et al. 2010, Oyewumi and Kazaria 1994 and James et al. 2009b) identified adequate knowledge

among HCPs toward ECT 62 (91.2%), 74.2%, and $p < 0.022$, all of which were statistically significant. However, among the reasons associated with increase in their knowledge as stated by these studies were additional years of HCPs experience, orientation and information gained from other health professionals. This finding is supported by Lutchman et al. (2009) who reported HCPs knowledge response of 74% from his findings which was conducted in developed countries. Therefore, in order to increase HCPs knowledge, there is need for special training regarding ECT by those who are well experienced in ECT procedures and establishing ways to regain knowledge from other sources such as media.

In the present review, in terms of HCPs attitudes toward ECT, respondents from four studies out of six observational studies reported positive attitudes regarding ECT (James et al. 2009a, James et al. 2010, Oyewumi and Kazaria 1994 and James et al. 2013). Findings from these studies were highly significant statistically 80.5%, $p < 0.001$ (61.1%), 69.7%, $p < 0.017$ (70.7%). These studies highlighted factors associated to positive attitudes- factors included positive response from most patients after treatments, use of anaesthesia and muscles relaxants, ECT procedure is cheaper compare to some medications and additional years of experience of practitioners, all these factors have influence toward positive attitudes. On the other hand, two studies reported negative attitudes toward ECT; the RCT and an observational study (Farrant et al. 1979 and James et al. 2009b) 86% and $p < 0.001$ (64.5%). These two studies finding were also statistically significant. Although, the negativity reported was related to unmodified ECT (with no anaesthesia or muscles relaxants), other related adverse effect such as memory loss experienced by some patients also contributed. The positive attitude from this review finding in similar to findings of Alhadi et al. (2017) who reported positive attitudes among the respondent when he conducted studies within

Saudi Arabia results of which also show statistical significant results with p <0.0001, respectively.

This review's findings have considered related myths and misconceptions toward ECT and reported as outcomes in terms of ECT being misused/overused. Out of 3 studies that reported on this statements, two studies being the majority (James et al. 2009a and James et al. 2010) reported result which were statistically significant p < 0.001 and p <0.0001 (51%). Also, in this group of respondents among the highlighted reason as ECT is being misused/overused includes ECT were used among poorer populations, form punishment to incorporate patient and lack of restricted use of ECT guidelines. This is supported by Alhadi et al (2017) who reported 80% of respondent disagreed that ECT is being misused.

In addition, there is disagreement from more than half of the respondents that reported ECT causes slight brain damage in studies by James et al (2009a) and James (2013) with high proportion (81.9% and 63.2%, respectively) of respondents not agreeing with the statement Among the reason mentioned by the respondents was ECT units provided facilities to offer modified type of ECT therefore causing no brain damage. This is supported by Alhadi et al. (2017) who reported ECT does not cause brain damage with a value of p <0.0001 also which is consider significant.

In relation to considering recommended used of ECT guidelines by HCPs, the findings from all the three studies who reported on guidelines (James et al 2013, James et al. 2010 and Oyewumi and Kazaria 1994) reported high proportion of respondents (76.4%, 55.2% and 85%, respectively) agreed with the requirement to have guidelines Among the supported points raised include issuance of ECT guidelines would not cause any harm or intermingle with patients care, it reduces/minimises adverse side effects to the patients by using

modified types of ECT which goes along with criteria in accreditation of the ECT units. The presents study findings goes along with Martin and Elworthy (2013) from Scotland (developed country) who reported more than half of the Psychiatrists respondents from his study adhered with the use of ECT guidelines with (51%).

Conclusion

The main aim of this review was to examine and critically explore health care professional's knowledge and attitudes regarding ECT (in African countries) by considering primary quantitative studies based on the available evidence thereby improving the practice clinically. Within this review, seven studies were retrieved and then included in this systematic review.

In this review, a robust search strategy through recommended databases together with a written protocol were presented. Also, the process of critical appraisal as well as data extraction were carried out by giving consideration to the most recent and recommended tools of Joanna Briggs Institute, thereby maintaining the rigour and methodological quality of the included studies and measures were taken to avoid errors by consulting a second independent reviewer. After data extraction, the information is presented in the tables to indicate variations within studies which resulted in the use of narrative approach/synthesis in reporting the results due to heterogeneity of the studies. Considering the nature of the review question as well as the PICO component, these studies were categorised based on knowledge theme, attitudes themes and outcomes thereby answering the review questions.

Based on the evidence of these seven studies included and results collated, it is concluded that adequate knowledge exits among HCPs towards ECT in African countries. Likewise, HCPs attitudes was positive toward ECT all of which were supported with reasons. On the

other hand, considering the outcomes reported by these studies, most respondents disagreed with statements that ECT is misused/overused. However, on ECT causes brain damage statements, more than half of the respondent disagreed. Whereas, on the use of recommended ECT guidelines statement, majority of them recommended the used of ECT guidelines.

Implication to practice

Training and teaching HCPs about proper awareness regarding the nature of ECT intervention not only amongst themselves but also among patients, their relatives and public during clerkship or via media as this will improve their positive attitudes.

Assessing health care practitioner's knowledge after each psychiatric posting in ECT ward/units either by exams or tests as this will increase their theoretical knowledge regarding ECT.

Recommendations

Future recommendations or areas that need to be addressed include:

A true blinded RCT design, with a multiple centre approach rather than single centre across African countries using validated tools with sufficient population.

Publishing studies/papers with good methodological approach in determining Health care practitioners in terms of their knowledge and attitudes regarding ECT, this will play a pivotal role in conducting systematic literature review because only publish work are considered.

Limitations

The approach of this systematic review was aimed to answer the research question as clearly stated in the protocol. Meanwhile, considering the nature of the review which emphasised on published studies and restricted to English language only, this could possibly have contributed to selection bias or language bias. So also, lack of similarities within studies about population, setting, intervention, studies design and outcomes (heterogeneity) might have contributed in limiting data interpretation in this review. Similarly, in considering the timescale in the process of search strategies from the search engine, critical appraisal and data extraction despite some help from the second reviewer, this also contributed to some limitations.

Chapter seven- Reflection

It is human nature to intentionally reflect on certain/significant event that has happened in their lives to learn from the experience (Hayler 2015). Reflective practice is the way in which we learn from an experience to understand and develop practice as defined by Jasper (2003). Whereas, Caldwell and Grobbel (2013) identified reflection in nursing as a means/source by which health practitioner's knowledge is increased or hones their clinical competency. Many models can be used/ applied during reflection. But in respect to this review, the Borton development model (1970) which comprises of three aspect regarding reflection will be consider and used. These are *What? So What? and Now What?* In the mentioned order.

What?

At initial stage, it sounded overwhelming and challenging to me when I decided to conduct a research study more so as a secondary research like systematic review. Fortunately, after my academic journey and battling with my modules in doing critical appraisals, research proposal together with other assignments my mind was little bit at rest due to my learnings and support I was given during this process. But when it came to type of dissertation i.e. should I go for empirical research, evidence based or systematic review, I was still in doubt on what to do. However, by considering the nature of each study mentioned above in terms of their advantages and disadvantages, I was able to plan my dissertation.

I looked at the ethical approval issues in which any proposal must undergo if I am going to conduct either empirical or evidence base research. Looking at the complexities and timescales for getting approval, I selected systematic review since it the only one that

required no ethical approval. Therefore, my mind settled in conducting it. Moreover, after I have made decision to conduct a systematic review of literature, the next thing that comes into my mind was on what field or area of interest, still another brain storming began by thinking should I go to educational field, community or mental health area. I finally decided to consider mental health field because it is one of the noble area of interest, in fact it is even what I have applied in Cardiff University for my MSc programme, but I was fortunate to get accepted for MSc Advance Practice. However, I started developing interest in mental health field when I was in college of nursing. During my final year, my psychiatric posting was in one of the major psychiatric hospital in the country, where patients with mental illness were admitted from different part of the country. While training there, newly admitted patients that were so aggressive or were diagnosed with major depression, mania catatonia or schizophrenia were placed on ECT procedure. As at that time, the unmodified type of ECT was the only one available in which no general anaesthesia or muscle relaxant were given and no Bargonic chair being used. For the procedure, we normally placed patient on bed 4 to 5 students' nurses together with registered nurses each by the side of the bed with patient lay in dorsal position with his/her arms by the side, a bedsheet spread over the patent from chest downward. The main duty of students (which included me) or nurses at this time is to hold the spreadsheet over the patient tightly from both side then electric shock was given with electrodes placed either unilaterally or bilaterally on the patient's head. The electric shock caused patient to convulse until they became unconscious for a while. During this period, some patients defecate, passed urine or even sustained fractures or dislocation of small bone. I considered it as inhumane when I observed this procedure for the first time, and when we asked the mode of action regarding it we were told it is

unknown and that is what shocked me more and I bored it my mind that one day I will conduct a research regarding ECT.

So, what?

At this stage being it the second step of the theory, I started thinking about options on what and how to investigate regarding literature for this systematic review because this process need extensive planning and focussed attention even for those with experience/expertise unlike me who is total novice with only some high-level understanding of systematic reviews. I trialled a few options about how to formulate the question for this review and by reading a book titled- Doing a systematic review- a student's guide by Boland et al. (2014) and consulting my supervisor, I later understood following a PICO components serve as a guide and plays a pivotal role in formulating research questions. At initial stage, I wanted to go for qualitative systematic review but due to inadequate papers and nature of the study setting regarding qualitative studies in African countries, I later changed mind to go for quantitative review after I have searched through Prospero and the CDR. That is when I realised that there was no single related systematic review study on knowledge and attitudes toward ECT in any of the African countries. From the little understanding, I have regained for critique from some of the written assignments I have taken it was big leap to consider doing a systematic review which would have involved a detailed critique.

Although I was familiar with basic search by using relevant key words but when it comes to advanced search I really found it difficult. I started practicing for the first time and it yielded no result or zero result, so I was tensed and worried about search strategies process. Later, I was introduced to the librarian who guided me thoroughly on how to conduct search strategies using specific symbols or Boolean together with creating account and saving my

finding from each individual data base. Moreover, inclusion and exclusion criteria process was harder than anticipated because it is time consuming and therefore need time managements by looking at studies titles, abstract or some time the whole articles to retrieve and include relevant studies published using English language only, and excluding irrelevant ones such as those written in other languages.

In conducting this systematic review, the international agencies such as CRD, JBI and the Cochrane collaboration have played a paramount role in helping reviewers to be consistent by using a standardised/validated as well as up-to-date information regarding certain tools. For instance, in this review the most recent tools for JBI (2016) were considered and used for critical appraisal process and likewise the MAStARI data extraction form which was used by both the primary and secondary assessor. However, within this review the most difficult aspect per my experience is the data collection and interpretation of findings since this was associated with heterogeneity within the studies interventions, population, studies designs, settings and outcomes.

Now what?

From the perspective of research, looking at the process involved in undertaking systematic review being a huge undertaking, conducting it independently sounds quite challenging and emotional. However, considering the impression, motivational effort and courage received from my academic supervisor Judith Carrier who has supported and guided from the beginning up to the completion of this dissertation. I have learnt a lot and gained insight into areas with possible improvement in practice and I have also achieved some knowledge regarding ECT during this process.

Personally, I have regained skills and understanding about various aspects of systematic review such as protocol writing, search strategies, critical appraisal and data extraction process using standardised and validated tools in conducting systematic review.

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Appendix 1

PsychInfo Database search

SEARCHS	TERMS	RESULT
S1.	Exp. health personnel attitudes	20039
S2.	Nursing staff, hospital.mp	1
S3.	Exp Nurses	26505
S4	Registered nurse.mp	854
S5	Exp. Health personnel	118418
S6	Health professional.mp.	3819
S7	Exp Nursing Students	4297
S8	Staff nurse.mp.	205
S9	Health care support.mp.	65
S10	Psychiatric staff.mp.	S317
S11	Ect nurse.mp.	3
S12	Qualified nurse.mp	42
S13	Mental health nurse.mp.	381
S14	Doctors.mp. or exp physicians	49269
S15	Exp medical students	11683
S16	Exp physicians	39299
S17	Exp caregivers	22884
S18	Health caregivers.mp	109
S19	Exp psychiatry	44293
S20	Exp psychiatrists	10695
S21	Exp medical personnel	71511
S22	Health care providers.mp.	8352
S23	Exp mental health personnel	46679
S24	Mental health staff.mp.	439
S25	Exp general practitioners	5384
S26	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25	215222
S27	Electroconvulsive therapy.mp	4935
S28	Electroconvulsive therap.mp.	4942
S29	Exp electroconvulsive shock therapy	5750
S30	Electric shock therapy.mp.	111
S31	Electroshock.mp.	1323
S32	Electric convulsive therapy.mp.	58
S33	Electric stimulation therapy.mp.	23
S34	Ect psychotherapy.mp.	13
S35	Shock treatment.mp.	405
S36	Ect treatment.mp.	480
S37	27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36	8469

S38	(Africa or Africa or Algeria or Benin or Botswana or Burkina faso or Burundi or Cameroon or Canary Island or Cape Verde or Central African Republic or Chad or Comoros or Congo or Democratic Republic of Congo or Djibouti or Egypt or Equatorial Guniea or Eritrea or Ethiopia or Gabon or Gambia or Ghana or Guniea or Guniea Bissau or Ivory Coast or Cote dlvoire or Jamahiriya or Jamahiriya or Kenya or Lesotho or Liberia or Libya or Libia or Madagascar or Malawi or Mali or Mauritania or Mauritius or Mayote or Morocco or Mozambique or Mocambique or Namibia or Niger or Nigeria or Principe or Reunion or Rwanda or Sao Tome or Senegal or Seychelles or Sierra Leone or Somalia or South Africa or St Helena or Sudan or Swaziland or Tanzania or Togo or Tunisia or Uganda or Western Sahara or Zaire or Zambia or Zimbabwe or Central African or Central African or West Africa or West African or Western Africa or Western African or East Africa or East African or Eastern Africa or Eastern African or North Africa or North African or Northern Africa or Northern African or South African or Southern Africa or Southern African or sub Sahara Africa).mp. [mp=title, abstract, heading word, table of contents, key concept, original title, tests & mesures]	91839
S39	26 and 37 and 38	11

Appendix 2

Cochrane Database search

SEARCH	TERMS	RESULTS
# 1.	Attitude of health personnel	2285
# 2.	Nursing staff, hospital	2466
# 3.	Nurs	32746
# 4.	Registered nurse	1136
# 5.	Health personnel	11108
#6.	Staff nurse	2298
#7.	Students nursing	1110
#8.	Health care support workers	2049
#9.	Psychiatric staff	1307
#10.	Ect nurse	45

#11.	Qualified nurse	322
#12.	Mental health nurse	1497
#13.	Doctors	4079
#14.	Student medical	4852
#15.	Physician	19835
#16.	Caregivers	4813
#17.	Psychiatry	30230
#18.	Medical personnel	8380
#19.	Health care providers	6510
#20.	Mental health staff	2000
#21.	Mental health staff	2000
#22.	General practitioners	4830
#23.	{or #2#23}	96869
#24.	Electroconvulsive therapy	1082
#25.	Electroconvulsive therapy	1083
#26.	Electroshock therap	74
#27.	Electric shock	169
#28.	Electric shock therap	413
#29.	Electric convulsive therap	54
#30.	Electric stimulation therap	3386
#31.	ect psychotherapy	0
#32.	Shock treatment	3737
#33.	Ect treatment	738
#34.	{or #25#34}	8583
#35.	(Africa or Africa or Algeria or Benin or Botswana or Burkina faso or Burundi or Cameroon or Canary Island or Cape Verde or Central African Republic or Chad or Comoros or Congo or Democratic Republic of Congo or Djibouti or Egypt or Equatorial Guniea or Eritrea or Ethiopia or Gabon or Gambia or Ghana or Guniea or Guniea Bissau or Ivory Coast or Cote dlvoire or Jamahiriya or Jamahiriya or Kenya or Lesotho or Liberia or Libya or Libia or Madagascar or Malawi or Mali or Mauritania or Mauritius or Mayote or Morocco or Mozambique or Mocambique or Namibia or Niger or Nigeria or Principe or Reunion or Rwanda or Sao Tome or Senegal or Seychelles or Sierra Leone or Somalia or South Africa or St Helena or Sudan or Swaziland or Tanzania or Togo or Tunisia or Uganda or Western Sahara or Zaire or Zambia or Zimbabwe or Central African or Central African or West Africa or West African or Western Africa or Western African or East Africa or East African or Eastern Africa or Eastern African or North Africa or North African or Northern Africa or Northern African or South African or Southern Africa or Southern	25665

	African or sub Sahara Africa).mp. [mp=title, abstract, heading word, table of contents, key concept, original title, tests & mesures]	
#36.	{and #24,#35#36}	267

Appendix 3

BNI SEARCH STRATEGY

SET#	SEARCHED FOR	DATABASES	RESULTS
S1	((((attitudes of health personnel) OR (nursing staff hospital) OR nurs OR (registered nurse)OR (health personnel) OR (health professional) OR staff nurse OR students nurse OR health support worker OR psychiatric staff OR ect nurse OR qualified nurse OR mental health nurse OR doctor OR students medical OR physician OR caregivers OR health caregivers OR psychiatry OR psychiatrist OR medical personnel OR health care provider OR mental health staff OR general practitioners AND su (electroconvulsive therapy OR electroconvulsive therap OR electroshock therap OR electric convulsive therap OR electric shock therap OR ect psychotherapy OR shock treatment OR shock therap OR electric stimulation therap OR electro stimulation treatment AND Africa OR Africa OR Algeria OR Benin OR Botswana OR Burkina faso OR Burundi OR Cameroon OR Canary Island OR Cape Verde OR Central African Republic OR Chad OR Comoros OR Congo OR Democratic Republic of Congo OR Djibouti OR Egypt OR Equatorial Guniea OR Eritrea OR Ethiopia OR Gabon OR Gambia OR Ghana OR Guniea OR Guniea Bissau OR Ivory Coast OR Cote dlvoire OR Jamahiriya OR Jamahiriya OR Kenya OR Lesotho OR Liberia OR Libya OR Libia OR Madagascar OR Malawi OR Mali OR Mauritania OR Mauritius OR Mayote OR Morocco OR Mozambique OR Mocambique OR Namibia OR Niger OR	British Nurse Index These databases are search for part of your query.	329 0

	Nigeria OR Principe OR Reunion OR Rwanda OR Sao Tome OR Senegal OR Seychelles OR Sierra Leone OR Somalia OR South Africa OR St Helena OR Sudan OR Swaziland OR Tanzania OR Togo OR Tunisia or Uganda OR Western Sahara OR Zaire OR Zambia OR Zimbabwe OR Central African OR Central African OR West Africa OR West African OR Western Africa OR Western African OR East Africa OR East African OR Eastern Africa OR Eastern African OR North Africa OR North African OR Northern Africa OR Northern African OR South African OR Southern Africa OR Southern African OR sub Sahara Africa).mp. [mp=title, abstract, heading word, table of contents, key concept, original title, tests & mesures]		

Note: duplicates are removed from the search and from result count.

Appendix 4

CINAHL Database search

SEARCH ID#	SEARCH TERMS	RESULT
S1	MH ”attitude of health personnel+”	2431
S2	MH “nursing staff, hospital”	123
S3	MH ”nurses+”	321
S4	MH ”registered nurses”	1253
S5	MH ”health personnel+”	24
S6	”health professionals”	231
S7	MH ”staff nurses”	2314
S8	MH ”students, nursing+”	165
S9	”healthcare support workers”	456
S10	MH ”health personnel+”	234
S11	”psychiatric staff”	178
S12	”ect nurse”	2341
S13	”qualified nurse ”	123
S14	”mental health nurse”	543
S15	”doctors”	65
S16	MH ”students, medical”	1234
S17	”physician”	876
S18	MH ”caregivers”	453
S19	”health givers”	234
S20	MH ”psychiatry+”	654
S21	MH ”psychiatry”	231
S22	MH ”medical personnel”	123
S23	”health care providers”	786

S24	“Mental health staff”	345
S25	”general practitioners”	1235
S26	S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38	23451
S27	MH ”Electroconvulsive therapy”	2314
S28	“therapies, electroconvulsive”	1987
S29	“electroconvulsive shock therapy”	34
S30	“electroshock therapy”	532
S31	“ect”	123
S32	MH “Electroshock	231
S33	“shock therapy”	1234
S34	“electric stimulation therapy”	754
S35	“ect therapy”	980
S36	“ect procedure”	237
S37	S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11	47
S38	(MH “Africa+”) OR “Africa” OR (MH “Africa South of the Sahara+”) OR (MH “Africa, Western+”) OR (MH “Africa, Southern+”) OR (MH “Africa, Northern+”) OR (MH “Africa, Eastern+”) OR (MH “Africa, Central+”) OR (MH “South Africa”) OR (MH “Namibia”) OR (MH “Guniea-Bissau”) OR (MH “Guniea “) OR (MH “Ghana”) OR (MH “Gambia”) OR (MH “Gabon”) OR (MH “Ethiopia”) OR (MH “Eritrea”) OR (MH “Equatorial Guinea”) OR (MH “Egypt”) OR (MH “Djibouti”) OR (MH “Democratic Republic of the Congo”) OR (MH “Cote d’Ivoire”)	
S39	S12 and S13 and S39	Total of 6 results

Appendix 5

WEB OF SCIENCE Database search

SEARCH	TERMS	RESULTS
#1	“Attitudes of health personnel”	62
#2	“nursing staff, hospital”	45
#3	“nurs”	240,423
#4	“registered nurse”	1,621
#5	“health personnel”	3,048

#6	“health professional”	4,772
#7	“staff nurse”	419
#8	“students nursing”	165
#9	“health care support workers”	15
#10	“psychiatric staff”	137
#11	#10 OR #9 OR #8 OR #7 OR #6 OR #5 OR #4 OR #3 OR #2 OR #1	246,837
#12	“ect nurse”	1
#13	“qualified nurse”	77
#14	“mental health nurse”	326
#15	“doctors”	55,444
#16	“students medical”	625
#17	“physician”	118,910
#18	“caregivers”	38,058
#19	“health caregivers”	100
#20	“psychiatry”	57,521
#21	“medical personnel”	3,099
#22	“health care providers”	8,623
#23	“mental health staff”	270
#24	“general health practitioners”	5
#25	#24 OR #23 OR #22 OR #21 OR #20 OR #19 OR #18 OR #17 OR #16 OR #15 OR #14 OR #13 OR #12 OR #11	496,027
#26	“electroconvulsive therapy”	7,285
#27	“electroconvulsive therap”	7,293
#28	“electroshock therap”	236
#29	“electroshock”	3,014
#30	“electric shock therap”	84
#31	“electric convulsive therap”	72
#32	“electric stimulation therap”	437
#33	“ect psychotherapy”	1
#34	“shock treatment”	1,696
#35	“ect treatment”	362
#36	#35 OR #34 OR #33 OR #32 OR #31 OR #30 OR #29 OR #28 OR #27 OR #26	12,555
#37	“Africa”	441,732
#38	#37 and #36 and #25	4

Appendix 6

JBI Critical Appraisal Checklist for Case Control Studies

Reviewer_____Date_____

Author _____Year_____Record Number_____

_____

	Yes	No	Unclear	Not applicable
Were the groups comparable other than the presence of disease in cases or the absence of disease in controls?	□	□	□	□
Were cases and controls matched appropriately?	□	□	□	□
Were the same criteria used for identification of cases and controls?	□	□	□	□
Was exposure measured in a standard, valid and reliable way?	□	□	□	□
Was exposure measured in the same way for cases and controls?	□	□	□	□
Were confounding factors identified?	□	□	□	□
Were strategies to deal with confounding factors stated?	□	□	□	□
Were outcomes assessed in a standard, valid and reliable way for cases?	□	□	□	□
Was the exposure period of interest long enough to be meaningful?	□	□	□	□
Was appropriate statistical analysis used?	□	□	□	□

Overall appraisal: Include □ Exclude □ Seek further info □

Comments (Including reason for exclusion)

Appendix 7

JBI Critical Appraisal Checklist for Cohort Studies

Reviewer_____Date_____

Author _____Year_____Record Number _____

	Yes	No	Unclear	Not applicable
Were the groups similar and recruited from the same population?	□	□	□	□
Were the exposures measured similarly to assign people to both exposed and unexposed groups?	□	□	□	□
Was the exposure measured in a valid and reliable way?	□	□	□	□
Were confounding factors identified?	□	□	□	□
Were strategies to deal with confounding factors stated?	□	□	□	□
Were the groups/participants free of the outcome at the start of the study (or at the moment of exposure)?	□	□	□	□
Were the outcomes measured in a valid and reliable way?	□	□	□	□
Was the follow up time reported and sufficient to belong enough for outcomes to occur?	□	□	□	□
Was follow-up complete, and if not, were the reasons to loss to follow-up described and explored?	□	□	□	□
Were strategies to address incomplete follow-up utilized?	□	□	□	□
Was appropriate statistical analysis used?	□	□	□	□

Overall appraisal: Include □ Exclude □ Seek further info □

Comments (Including reason for exclusion)

Appendix 8

JBI Critical Appraisal Checklist for Analytical Cross Sectional Studies

Reviewer_____Date_____

Author _____Year_____Record Number _____

	Yes	No	Unclear	Not applicable
1. Were the criteria for inclusion in the sample clearly defined?	□	□	□	□
2. Were the study subjects and the setting described in detail?	□	□	□	□
3. Was the exposure measured in a valid and reliable way?	□	□	□	□
4. Were objective, standard criteria used for measurement of the condition?	□	□	□	□
5. Were confounding factors identified?	□	□	□	□
6. Were strategies to deal with confounding factors stated?	□	□	□	□
7. Were the outcomes measured in a valid and reliable way?	□	□	□	□
8. Was appropriate statistical analysis used?	□	□	□	□

Overall appraisal: Include □ Exclude □ Seek further info □

Comments (Including reason for exclusion)

Appendix 9

JBI Critical Appraisal Checklist for Randomized Controlled Trials

Reviewer_____Date_____

Author _____Year_____Record Number _____

	Yes	No	Unclear	NA
Was true randomization used for assignment of participants to treatment groups?	□	□	□	□
Was allocation to treatment groups concealed?	□	□	□	□
Were treatment groups similar at the baseline?	□	□	□	□
Were participants blind to treatment assignment?	□	□	□	□
Were those delivering treatment blind to treatment assignment?	□	□	□	□
Were outcomes assessors blind to treatment assignment?	□	□	□	□
Were treatments groups treated identically other than the intervention of interest?	□	□	□	□
Was follow-up complete, and if not, were strategies to address incomplete follow-up utilized?	□	□	□	□
Were participants analysed in the groups to which they were randomized?	□	□	□	□
Were outcomes measured in the same way for treatment groups?	□	□	□	□
Were outcomes measured in a reliable way?	□	□	□	□
Was appropriate statistical analysis used?	□	□	□	□
Was the trial design appropriate, and any deviations from the standard RCT design (individual randomization, parallel groups) accounted for in the conduct and analysis of the trial?	□	□	□	□

Overall appraisal: Include □ Exclude □ Seek further info □

Comments (Including reason for exclusion)

Appendix 10

Data Extraction Tools

JBI Data Extraction Form for Experimental / Observational Studies

Reviewer _____ Date _____

Author _____ Year _____

Journal _____ Record Number _____

Study Method

RCT ☐ Quasi-RCT ☐ Longitudinal ☐

Retrospective ☐ Observational ☐ Other ☐

Participants

Setting

Population

Sample size

Group A _____ Group B _____

Interventions

Intervention A

Intervention B

Authors Conclusions:

Reviewers Conclusions:

Study results

Dichotomous data

Outcome	Intervention ( ) number / total number	Intervention ( ) number / total number

Continuous data

Outcome	Intervention ( ) number / total number	Intervention ( ) number / total number