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TRAUMATIC BRAIN INJURIES IN THE KINGDOM OF SAUDI ARABIA

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TRAUMATIC BRAIN INJURIES IN THE KINGDOM OF SAUDI ARABIA

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A Research Paper

Submitted in Partial Fulfillment of the Requirements for the Master of Science

Rehabilitation Institute
in the Graduate School
Southern Illinois University Carbondale
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Approved by:

Dr. William Crimando, Chair

Graduate School
Southern Illinois University Carbondale
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Chapter 1

STATEMENT AND DEFENSE OF PROBLEM STATEMENT

One of the biggest challenges facing the Kingdom of Saudi Arabia's (KSA) health care system today is the ongoing epidemic of automobile accidents that have resulted in severe brain injuries for thousands of people across the country. According to a recent news article there is one traffic accident every minute occurring in the Kingdom and every year over 7,000 people are killed. In the article the secretary general of the Traffic Safety Committee of the KSA, Sultan bin Al-Zahrani, said there are also 39,000 severe injuries that also occur because of the epidemic of traffic accidents (Traffic accidents occur every minute in KSA, 2015). According to another major study many of these accident victims have suffered severe head injuries resulting in many different kinds of traumatic brain injuries (TBI) (Al-Habib et al., 2013).

As a result of this ongoing crisis the government of the KSA has been involved in many efforts and engaged in many activities over the years to address this health crisis. For example, as early as 2004 the government built a rehabilitation center near the capital of Riyadh to help meet the growing demand for care of these accident victims (Harrison, 2004). The government has also been involved in developing and building other rehabilitation facilities across the country. Many organizations and health care providers from around the world, including many from the United States, have gone to the KSA and are providing services and training. Moreover, in recent years there have been changes in education and training opportunities for Saudi citizens to engage in rehabilitation services and enter into this area of health care. Furthermore, there have been many changes in trauma care and the government has also begun to intervene in trying to reduce the crisis by implementing new measures like changing laws and engaging in more public education. All of these things have resulted in many new developments in the field of

rehabilitation medicine and therapy including many new developments in rehabilitation counseling.

Another major issue which is beginning to be addressed in the KSA is the status of patients with TBIs within the greater disabled community. Although disability is a multidimensional and complex concept, up until recently all individuals with any type of disability in the KSA have been viewed largely as a single group with little recognition of the needs and services different disabilities require. As a result individuals with physical or emotional impairments too mental or cognitive limitations, including substance abuse issues, have all been seen similarly with little regard that some may require a continuous health care support system, professional counseling, rehabilitation services, regular medical checkups, home based support and other supportive services or long term specialized residential treatment in the case of many TBI patients (Al-Jadid, 2013).

This research paper will look at these issues from a broad perspective and give the reader an overview of the many problems associated with TBIs from many vantage points including; the major causes and types of TBIs, what types of rehabilitation services for TBIs are available, what new strategies are being implemented by the government to address the causes of these problems and what are some of the long term problems facing the KSA in dealing with TBIs in the future. Moreover, there is a vast amount of literature on these different topics related to TBIs which are analyzed and presented in the chapter containing the literature review. Furthermore, this research paper will look at other related literature addressing a wide variety of topics such as the changing attitudes of Saudi citizens regarding the treatment and care of disabled people in the country. In addition, the role of Muslim counselors entering the field of rehabilitation counseling and the question of disabilities from an Islamic perspective will be addressed. Finally, the

research paper will review some of the new opportunities for professional careers and opportunities in rehabilitation and specialized counseling in the KSA, as well as a review of future challenges the health care industry faces especially in regards to TBI services.

Background of problem

For over a decade it has been acknowledged by many observers and in many different types of sources that road traffic accidents, including automobile collisions with pedestrians, in the KSA are the major cause of TBIs in the country (Ghaffar & Meraj, 2015). For example, as early as the 2004 World Health Organization's (WHO) Report on Road Traffic Injury Prevention: Summary (World Health Organization, 2004) said that mortality due to road traffic accidents per 100,000 population in Saudi Arabia is 24.8 annually and that an even higher number of people suffer life debilitating injuries like limb amputations, paralysis, and traumatic brain injuries (TBIs).

The high incidences of traffic accidents in the KSA have been widely reported for over two decades. For example, the alarming headlines from a 2010 report read "Saudi Arabia Has the Highest Road Accident Death Toll in the World (Joffe-Walt, 2010)." In this article, reporter Benjamin Joffe-Walt writes that an average of 17 Saudi Arabian residents die on the country's roads each day which has resulted in 86,000 deaths since 1990. Moreover, he reports that there have been 611,000 injuries as a result of these accidents with 7% resulting in permanent disabilities (Joffe-Walt, 2010).

A search of news reports about deadly traffic accidents in the KSA finds literally hundreds of news stories in newspapers and news sites such as *Al Eqtisadiyah*, *Al Madina*, *Al Riyadh*, *Al-Yaum*, *Arab News* and one of the most widely circulated newspapers published in the KSA called *Okaz*. Headlines such as "1 Dead and 4 In Critical Condition After Fatal Saudi

Arabia Road Accident (Kwentong, 2016)”, “Saudi road crash kills 15, including six children (Toumi, 2016),” and “Nine killed in road accident near Hail (Rasooldeen, 2016),” are common news stories in the KSA. Moreover, numerous reports and studies beginning over twenty years ago have recognized this problem and been warning the government to adopt measures to address the crisis (Ansari, Akhdar, Mandoorah, & Moutaery, 2000).

One study by Ansari, et al entitled “Causes and effects of road traffics accidents in Saudi Arabia” (Ansari et al., 2000) reported that between 1971 and 1997 a total of 564, 762 people either died or were seriously injured in road traffic accidents. At that time the KSA did not have any long term care TBI treatment programs in the country. The study also said that 79.2% of the patients admitted to the largest hospital at the time, Riyadh Armed Forces Hospital, had sustained spinal and brain injuries and many required amputations of limbs (Ansari et al., 2000). In the 2000 report Ansari recommended the compulsory use of seat belts in the Kingdom as a solution to the problem. He suggested that many of the TBIs could be reduced by educating Saudi’s about the importance of seat belt use (Ansari et al., 2000).

A more recent study from 2013 entitled “Causes and patterns of adult traumatic head injuries in Saudi Arabia: implications for injury prevention (AL-Habib et al., 2014)” investigated the cases of 1,870 traffic accident victims and discovered that an “alarming” 30% of them died as a result of the accident. Perhaps more alarming for the purposes of this research study is the finding that most patients (56.7%) had a severe THI (traumatic head injury) (AL-Habib et al., 2013)”. The study concluded that safety on the roads should be the primary target for any organized injury prevention programs to be successful (AL-Habib et al., 2013).

As a result of the epidemic or crisis of deadly traffic accidents the government of the KSA has slowly started trying to both understand and solve the problem. They have

commissioned some studies to try and understand the causes of the problem and what measures can be introduced to address the crisis (Joffe-Walt, 2010). However, the one government study (AL-Habib et al., 2014) which concludes that safety on the roads should be the primary target for any organized injury prevention programs to be successful (AL-Habib et al., 2014), seems to underestimate other social causes of the epidemic which are much more controversial in the KSA today. For example, as early as the 2004 World Health Organization (WHO) report it was recognized that other factors such as the prevailing culture and lifestyle of young Saudi men for their dangerous driving habits and noncompliance with traffic rules (World Health Organization, 2004) are probably much more responsible for the growing epidemic.

One article in *Foreign Policy* magazine actually questions whether or not young Saudi men should be allowed to drive. The article written by Katelyn Fossett reports on a 2013 Saudi study by the Kingdom's General Directorate of Traffic predicting that if current rates continue that by 2030, 4 million people will die annually in a car accident (Fossett, 2013). In the article Fossett interviews an expert consultant on the issue named Glenn N. Havinoviski who says that the problem is not because of the road system or traffic infrastructure. Instead, Havinoviski says that the reasons for the high rates are reckless driving, chronic unemployment and the constraints of ultraconservative social mores. Havinoviski says that the situation has created a culture among young Saudi men of participating in deadly activity behind the wheel that in Saudi Arabia is called "tufush." She said, "The scene has led observers [like Havinoviski] to compare the streets of Saudi Arabia to a mix of *Death Race* and *The Fast and the Furious* (Fossett, 2013)."

The connection of the traffic fatality epidemic to deeper cultural and social problems in Saudi Arabia is recognized by many people within leadership positions in the KSA like Ali Abdul-Rahman Al-Mazyad, a Saudi columnist in Riyadh. Although, he acknowledged that many

in the government do not want to address these deeper problems he suggests that the driving problems are with young people because there are very little outlets for young people to enjoy themselves and kids basically do what they want. Moreover, he observed that there are also not enough programs in schools to teach students about respecting the roads and teaching them driving skills. He also acknowledged that drug problems are beginning to contribute to the problem of road traffic accidents (Joffe-Walt, 2010).

Other observers like Silvio Saadi who is a young Jeddah-based businessman and film producer claims that the government and an out-of-control youth culture are responsible for the problem. In the online Middle East site called *The Media Line* (The Media Line, 2016), which was created in 2000 as a forum for journalists in the region to discuss controversial news and topics, Saadi reported his observations about the growing numbers of fatal traffic incidents. He said, “You won’t believe what you see,” he told *The Media Line*. In his article he says that Saudis often try to drift with normal cars while thousands of spectators are on the sides of the street. In this type of informal motor sport drivers intentionally over-steer so as to lose traction and drift on the road and sometimes the car drifts into the spectators, slamming them into buildings along the sidewalk (Joffe-Walt, 2010). In the article Saadi reported that the government’s road initiatives have not been successful, including a recent effort in Jeddah to get young people to use a government built racetrack for these events. Saadi said that this effort was not successful because the police cannot stop illegal driving activities on streets outside of towns and cities. Moreover, he claimed that the police are actually scared because there can be thousands of drivers and spectators involved in these incidents (Joffe-Walt, 2010).

It is important to compare reports like those of Saadi, Ali Abdul-Rahman Al-Mazyad, and *Foreign Policy* magazine with more official government published studies and reports. For

example, Al-Shammari in his report focuses more attention on the initial causes of the problem. He says that economic growth which happened because of the oil boom in the last few decades has brought significant changes to the road network and the number of cars on these roads (Al-Shammari, Bendak, & Algadhi, 2009). Other investigators and researchers like Mohammed Y. Al-Naami, Maria A. Arafah, and Fatimah S. Al-Ibrahim in their article “Trauma care systems in Saudi Arabia: an agenda for action (Al-Naami, Arafah, & Al-Ibrahim, 2010)” which was published in the official *Annals of Saudi Medicine* observe similar causes. They wrote in the report,

Saudi Arabia is undergoing a rapid population growth that along with improved socioeconomics has led many individuals to own a car or even a number of cars per family, resulting in a greater number of vehicles on the roads. The reduced focus on good public transportation systems and the dependence on cars for transportation have created a diversity of drivers who are unfamiliar with the local driving rules and lack the basic skills for safe driving (Al-Naami et al., 2010).

In response to these kinds of official internal reports about the crisis and growing awareness from outside groups like the World Health Organization the government of KSA has adopted many new measures over the past decade to try and address the problem. For example, over the past decade the government has begun a more aggressive and methodical collection of data on road traffic accidents (RTAs) and empowered the Traffic Safety Committee of the KSA with many new powers. The Traffic Safety Committee of the KSA has implemented new national speed limits and stepped up enforcement and the issuing of tickets. They have passed new drink driving laws which carry heavy fines and imprisonment. Moreover, they have passed a National Motorcycle Helmet law similar to one in the United States, begun to enforce a new

National Seat-Belt law, required all children to be seated in approved restraints, and passed a new law prohibiting hand-held mobile phone use while driving (KSA, 2016).

In addition to these initiatives the government of the KSA has introduced new formal audits of new road construction, begun inspections of bridges and existing road infrastructure, and invested in public transportation. These initiatives have been supported with increased funding for public education about auto safety, a major initiative to encourage walking and cycling, and an advertising campaign to encourage the use of public transportation (KSA, 2016). In addition, a series of new laws passed as recently as October of 2016, have imposed strict new penalties including jail time for drivers who overtake school buses while they pick up or drop off children, refuse to stop at checkpoints or when security patrols ask for it, and fail to stop at the scene of an accident (Gazette, 2016).

It is clear from these sources that the KSA has been experiencing a major crisis of fatal traffic accidents for many years and that they have finally begun to seriously address some of the causes of the problem in several ways. Unfortunately, one of the main tragedies of this crisis which has not been adequately addressed, are the vast numbers of accident victims who have survived with permanent paralysis, loss of limbs, and severe TBIs. Although some studies, mentioned above, have reported that over 50% of survivors of RTAs suffer some type of TBI, it has only been very recently that the KSA has started to acknowledge and address the needs and long term care of thousands of TBI victims.

In a 2014 article by Dr. Ahmed M. Aboabat, entitled “Traumatic Brain Injury Continuum of Care: The Saudi Arabia Perspective” (Aboabat, 2014) he discusses the pressing public health and medical crisis in the KSA resulting from TBIs. According to Dr. Aboabat the Kingdom’s rapid urbanization combined with changing lifestyles have led to different types of health

problems and phenomenal losses, among which TBI is eminent on the list (Aboabat, 2014). One of the problems Dr. Aboabat observes is that TBIs have gone largely unmeasured and consequently misunderstood for a long time by the larger medical community and decision makers in the KSA. He says that even though some early studies from Moutaery and Akhdar in 1998 (Akhdar, Al-Moutaery, & F, 1998) started to shed some light on the growing problem national data and research in the field is extremely limited (Aboabat, 2014, p. 20).

As a result of these circumstances Dr. Aboabat claims that it is not possible to discuss TBI in the KSA without uncertainty (Aboabat, 2014, p. 21). However, Dr. Aboabat is able to give us a picture with some accuracy about the state of available care for patients and accident victims as of 2013. He reports that at that time the Rehabilitation Hospital of King Fahad Medical City (RH-KFMC) was the only acute CARF (Commission on Accreditation of Rehabilitation Facilities) accredited governmental hospital that was providing a holistic approach to TBI rehabilitation. Moreover, he says that Saudi brain injured patients experience long waits before being admitted to rehabilitation facilities (Aboabat, 2014, p. 22). In fact, he says that from the available data in 2013 the average wait a TBI patient had to experience before placement into the RH-KFMC was 270.6 days compared to the USA average of 19.7 days. He suggests that this delay in patients' admission to specialized rehabilitation programs increases the risk of secondary complications such as contracture, pressure ulcers, joint stiffness, malnourishment, and increases the cost of TBI and subsequently prolongs the rehabilitation process (Aboabat, 2014, p. 23).

Overall, this background information shows that TBIs are a major problem in the KSA and that the present state of care and services for TBI patients' needs to be investigated in greater detail. Moreover, it is also important to review all of the efforts the government of the KSA and

the medical community are doing in regards to the major causes of TBIs such as mitigating the traffic fatality crisis. If the projections of analysts is correct and the traffic fatality crisis continues to progress without some substantial reductions the demand for TBI services and expertise will grow exponentially. Consequently, the need for a timely up to date review and analysis of the state of TBI related issues since 2013 in the KSA cannot be underestimated.

Significance of study

One of the important observations made by Dr. Aboabat in his article (Aboabat, 2014) is that TBIs in the KSA have gone largely unmeasured and consequently misunderstood. This observation is confirmed by many other scholars and researchers doing work in all of the areas related to TBIs. For example, in the article by Naif Al-Shammari (Al-Shammari et al., 2009) about understanding traffic accidents in the KSA, which they claim are the primary cause of TBIs, the authors maintain that one of the biggest problems facing authorities and researchers is the lack of data and clarity and accessibility problems with existing data (Al-Shammari et al., 2009, p. 552). Moreover, they say that in developing countries this lack of data and clarity is the main obstacle facing all efforts to understand the phenomenon and work toward finding solutions.

However, the need for establishing collaboration and working toward standardizing data related to TBIs is not only a developing world problem. In the article “Standardizing Data Collection in Traumatic Brain Injury (Mass et al., 2011)” the authors say that the way data exists today with so many coding variables and the confounding comparisons between and analysis across different studies makes it almost impossible to address the many uncertainties concerning treatment approaches in TBI (Mass et al., 2011). As a result of the confusion in trying to study and analyze treatment approaches, as well as ways to address preventive strategies for the causes

of TBIs, the authors suggest that professionals, doctors, researchers and policy makers should adopt common data elements (CDEs). They maintain that by adopting such CDE's researchers will be better able to monitor and analyze effective strategies for both reducing the causes of TBIs and improving treatment options for dealing with TBIs.

In providing long term care strategies and methods in the KSA it has recently been acknowledged by the doctors and administrators at the new TBI Rehabilitation Program at the Sultan Bin Abdullaziz Humanitarian City that there is a need to model and share experiences with other CARF accredited facilities (Pazdirek, 2015). In the report by the new facility executive rehabilitation staff they say that their therapy team members are facing some communication challenges related to different cultural and educational backgrounds. They say that their main goal is to facilitate precise mutual understanding and standardization of evaluation and therapy (Pazdirek, 2015).

It seems clear from these examples that there is a need to collect and analyze as much information about the many different aspects of TBIs in the KSA as possible. Since this is the primary goal of this research paper it should be an important new piece of information for all stakeholders interested in providing TBI services and those working to reduce the causes of TBIs in the KSA. Since no such research paper or document has collected these different TBI related topics into one document this work should be of some interest and relevance to students, administrators, and professional rehabilitation counselors working with TBI clients.

Purpose and objectives of paper

The main purpose of this research paper is to provide the reader with a broad overview of several different issues related to Traumatic Brain Injuries (TBIs) in the Kingdom of Saudi Arabia (KSA). This means that the objectives in the research paper are to organize different

information into clear and concise sub-sections which give information about these different issues such as:

1. An overview of the health care system in the KSA
2. A discussion and analysis of information about the causes of TBIs in the KSA and measures and recommendations for reducing TBI incidences in the country
3. A discussion and analysis of sources and information about TBI services including critical care and long term rehabilitation services in the KSA
4. A discussion of disability in the KSA, including public perceptions, historical treatment of the disabled, changing priorities of the government in approaching disabled services, future developments in the treatment of disabilities
5. Counseling issues from an Islamic perspective
6. Future developments and the growth of TBI services in the KSA
7. Conclusions and future research

Chapter 2

OVERVIEW OF THE LITERATURE

The following literature review is divided into five sections. Each section provides an over view of various aspects of issues related to counseling and to TBI treatment in the KSA. In order to understand the present situation regarding TBIs it is necessary to see all of the related topics and their connection to the broader issue. Researchers, counselors, developers and government officials need to know about the present health care infrastructure and its capabilities. Moreover, they need to know the main causes of TBIs and have knowledge of ways to mitigate their increases, as well as how the government is presently dealing with the problem. It is also important to know how the Saudi culture sees and deals with disability both historically and at the present time, because these issues can greatly impact how TBIs are dealt with in the Kingdom. In addition, it is important to have an understanding of the available resources for dealing with TBIs in the Kingdom.

Section 1 provides a broad look at the present health care system in the KSA and some of the literature available on this topic. This section is here because it is important for anyone working in the Kingdom to have a general understanding of how the system in the KSA is organized and how it is organized to deal with TBI related issues. It is also important to understand the available resources from government sources and literature so you can try to develop an analytical picture of issues related to TBI. Section 2 is an extension of the discussion in the introduction about the major causes of TBI in the Kingdom. It is widely recognized that road traffic accidents (RTAs) are largely responsible for the rising incidences of TBIs in the country. However, there is some data discussed in the review about other causes such as stroke and different types of accidents causing TBIs.

Section 3 looks at the limited information about long term services available for TBI patients in the Kingdom. Although, it is recognized that TBIs are one of the biggest health care challenges facing the country this information makes it clear that there is still a large need to improve and expand services for TBI victims. Moreover, there is information about the two long care facilities operating in the Kingdom providing services for TBI clients. Section 4 offers a discussion of some of the literature about disability in Saudi Arabia. It is important for anyone interested in working in the area of disability services, including rehabilitation counseling, to understand the historic issues related to disability in the country. The literature shows that in the past the culture held many stereotypes and biases against people with disability. However, these prejudices are changing in the present era and the government has embarked on an initiative to provide all disabled citizens with a bill of rights and guarantees of services.

Finally, Section 5 provides a brief over view of issues related to counseling from an Islamic perspective. This information is important for both Muslim and non-Muslim counseling professionals to be aware of in the developing field of Islamic counseling. Moreover, it is particularly important for organizations and non-Muslim counseling professionals to be aware of the many resources available to help them gain more cultural awareness and understanding of issues related to counseling Muslim clients. This information would be important for anyone planning to work in an Islamic country in the counseling field.

Literature Review

Overview of the Saudi Health System. In order to understand the issue of TBIs in Saudi Arabia it is important to look at the overall health care system in the KSA. There are many sources from governmental organizations and scholarly studies, including information from private health care companies, about the Saudi medical system. The official information of the KSA is available on the government health care web-site *Ministry of Health Portal* (Statistics and Indicators, 2016). This site provides annual studies of the health care system going back 15 years and has statistical data covering everything from the number of hospitals, physicians, dentists, nurses, hospital beds, incubators, and pharmacists too the types of diseases and health problems treated in the Kingdom. Moreover, the reports document the KSA's medical establishment's main achievements and future challenges. As a result these reports are a fundamental source for researchers of the KSA medical system.

In the 2015 annual report of the Ministry of Health (MOH) it states that its main achievement has been the marked decrease in the incidences of measles between the years 2006 and 2015 and the success of its overall immunization program for Diphtheria and tetanus toxoids (DTP), Oral Polio Vaccine (OPV), Bacille Calmette-Guerin/Tuberculosis Vaccine (BCG), Measles, Mumps, and Rubella Vaccine (MMR), and Pneumococcal Conjugate Vaccine (PCV). The report says that cases of measles decreased from 3.41 per 100,000 population in 2006 to 0.69 per 100,000 in 2015. Moreover, the report says that the immunization programs, listed above, have increased from covering 95% of the population to more than 97% (Statistics and Indicators, 2016). Other information in the report says that there are presently 69,394 hospital beds available in the country's 1,436 hospitals and that these figures reflect an annual growth rate of 2.05 %. Also, this number means that there are 22.0 beds per 10,000 population.

The 2015 report also states that there are 41,240 physicians, including 3,564 dentists, in the KSA and that there are 95,379 professionally trained and licensed nurses or 5.9 nurses per 10,000 population and several hundred thousand nursing support staff. The report says that the government is highly invested in training its personnel to meet the country's new health care challenges and also invested in recruiting more Saudi nurses and doctors. The MOH says that there are presently as of 2015, 539 Saudi nationals studying abroad on medical fellowships and scholarships programs. Moreover, these reports have detailed statistics by region covering such diverse things as birth and death rates, the number and types of oral surgeries performed, the number and types of malignant tumors listed by both sex and age, the number of patients on kidney dialysis and the number of people suffering from diabetes, including a compendium of information on the number of amputations as a result of diabetes (Statistics and Indicators, 2016). These examples are just a few of the types of information available from the MOH on their online site *Ministry of Health Portal*.

Unfortunately, for the purposes of this research paper the official government information in the MOH *Ministry of Health Portal* does not have specific information on TBIs or their causes and treatments. This shortcoming in the data has been identified in many sources. For example, according to Al-Shammari in his study this lack of data is one of the major problems facing the future of treatment and rehabilitation options for TBI victims in the KSA (Al-Shammari et al., 2009). Moreover, the shortcoming of specific data and reporting on TBI's as a special category has been recognized by (Aboabat, 2014). In his overview of TBIs in the KSA Dr. Aboabat explained that TBI is a major public health problem in Saudi Arabia, though national data and research in the field is extremely limited and in its best has been from isolated institutional studies (Aboabat, 2014).”

In the official MOH reports there is some information from which researchers might be able to ascertain some evidence about people undergoing rehabilitation treatments in the KSA. However, whether or not the rehabilitation treatments and hospitalizations are specifically for TBI's acquired because of RTAs or other causes such as stroke is impossible to determine with the available data. For example, from the 2015 report (Statistics and Indicators, 2016) it can be reported that there were 27,535 patients undergoing some form of speech and hearing therapy. In the 20 regions of the KSA there were 63,974 people in Occupational Therapy programs and an astonishing 526,525 in Physiotherapy. Also, the report says that in 2015 there were 65,744 people fitted with Prosthetics and undergoing physical therapy. Whether or not these prosthetics were necessary because of RTAs is not reported, nor are the reasons for the huge number of patients undergoing Physiotherapy explained (Statistics and Indicators, 2016).

Other sources of information provided by official organizations about the KSA can be found in the World Health Organization's (WHO) annual reports available at (Organization, Countries: Saudi Arabia: Statistics, 2016). These annual reports provide important statistical data about Saudi Arabia on many issues and have comparison data for all of the countries in the United Nations. For example, one can find information about infant mortality in Saudi Arabia and compare it with all the countries in the world. According to the report there are 21 infant deaths under the age of 5 years for every 1,000 live births in the KSA compared to 8 in the United States, 3 in Finland, 45 in Iraq, 200 in Somalia, etc. Moreover, there is information on such things as the maternal mortality ratio for live births per 100,000 pregnancies. In the KSA the maternal mortality rate is 18 per 100,000 compared to 11 in the United States, 7 in Canada, 1 in Ireland, 1000 in Cameroon, 300 in Iraq, and 4 in Kuwait. These statistics can be very useful for researchers to compare the KSA health care system to other countries.

The World Health Organization (WHO) reports also have a considerable amount of information about AIDS and HIV incidences worldwide and incidences and statistics on such things as case specific mortality data for malaria related deaths, tuberculosis, cancers, diabetes, and other communicable and non-communicable diseases. For example, according to the 2010 WHO report there were 1,491 deaths from malaria, 23 deaths from leprosy, and 158 from measles. The report also has information on the health care system such as Saudi's health care coverage. The report says that in the KSA 96% of births are attended by professional health staff like physicians, nurses or government licensed and trained mid-wives. Moreover, it reports that 11.6% of births are performed by a caesarian section. Unfortunately, like the MOH annual reports, the World Health Organization (WHO) reports do not have specific information on TBIs nor information about the incidences of RTA mortality rates in the world.

There are other sources of information about the KSA's medical system available from non-governmental organizations in the private sector. One of the largest organizations that provides worldwide country profiles is Colliers International (International, 2016). According to Colliers official website the organization is comprised of 16,000 skilled professionals operating in 66 countries that provide a full ranges of strategic services, advice, property sales and leasing, corporate solutions, workplace solution and consulting, and research services for businesses wanting to operate on the world stage. As a result, Colliers International has a detailed report on the KSA's medical establishments.

In Colliers most recent Saudi report published in 2012 the profile has a variety of important information that can be used to compare data compiled by independent sources with the official information provided by the MOH. In the 2012 report (International, Kingdom Of Saudi Arabia: Healthcare Overview, 2012) Colliers reported that the Healthcare budget for the

Kingdom was increased from SAR 30 billion (6.3% of total Government Budget) in 2008 to SAR 52 billion in 2009 (11% of total Government Budget) and to SAR 61.2 billion in 2010 (11.3% of total Government Budget) These statistics and rates are very different than information provided in official KSA reports which report a higher number of GDP spent on the MOH.

There are other areas of contradictions in the Colliers report and the official KSA report. For example, according to Colliers there were over 369 hospitals, both within the public and private sectors and a total number of doctors and nurses was approximately 62,805 with over 20% employed at hospitals in Riyadh (International, Kingdom Of Saudi Arabia: Healthcare Overview, 2012). The hospital number provided by Colliers of 369 is substantially lower than the number reported by the MOH which is 1, 436. There is no explanation for this large discrepancy. It may be possible that the larger 1,436 number also includes smaller clinics and doctor's offices or private surgeries. Also, the number of physicians and nurses reported by the MOH is substantially higher than the Collier number. The MOH reported there are over 136,000 professional doctors and nurses in the KSA compared to 62,805 reported by Colliers. Once again, there is no explanation for these discrepancies and this is a problem for researchers trying to collect and confirm data on the KSA.

Also, in the Collier report there is a "Sector Overview" that provides data on bed capacity, inpatient and outpatient data, insurance, and budgetary data. Moreover, the Collier report presents more criticism and critical analysis of the KSA system than is found in the official MOH report. Collier's reported that there is a substantial bed shortage in the Kingdom and that the delivery of services is far weaker in the suburbs than in the main cities in the country (International, Kingdom Of Saudi Arabia: Healthcare Overview, 2012). The report also said that

there are major shortages of medical health care professionals and that many Saudi national doctors seek to immigrate and leave the Kingdom. The report is also critical of the public nature of the KSA system and reported that Public Sector Hospitals are not cost driven and therefore provide quality healthcare services to the population either free or at subsidized rates (International, Kingdom Of Saudi Arabia: Healthcare Overview, 2012). However, they report that this system is non efficient and has led to shortages and increased healthcare costs for the KSA. As a result they encourage more privatization and competition of services. Once again, the Colliers report, like the official data from the World Health Organization (WHO) and Ministry of Health (MOH), does not have any specific information on TBIs or their connections to RTAs.

There are also many reports and overviews of the KSA's healthcare system provided by independent researchers and scholars. For example, the article by Amir A. Khaliq (Khaliq, The Saudi Healthcare System: A View from the Minaret, 2012) "The Saudi Healthcare System: A View from the Minaret" published in 2012 provides a broad overview of the MOH from an independent viewpoint. In this article Khaliq's analysis used information provided by the United Nations Development Program (UNDP), United Nations Children Fund (UNICEF), World Bank, World Health Organization (WHO) and information from the Saudi MOH. Khaliq says that his analysis shows that of the 191 member states in the WHO Saudi ranks 26th on overall performance and 61st on goal attainment, 58th on the basis of Disability Adjusted Life Expectancy and 63rd in health expenditure per capita in international dollars (Khaliq, The Saudi Healthcare System: A View from the Minaret, 2012). Moreover he says that Saudi has been implementing a three tiered healthcare system since the 1980's and has been introducing more private hospitals and services. His statistics claim there are 408 hospitals in the country with a total of 55,932 beds. In addition, his study has a breakdown of data for all of the hospitals by

sector such as private facility, public facility, military hospital, National Guard and other government entities.

Unlike the other reports Khaliq acknowledges that RTAs are the most common causes of death and disability in the KSA. He says that Saudi has the highest road-accident mortality rate in the world with 29 deaths per 100,000 population. Moreover he reports that 81% of deaths are caused by RTAs and that at any given time 20% of the hospital beds are occupied by victims of RTAs. This study says that the cost of this epidemic exceeds \$7 billion US and that injury and death from automobile accidents are likely to continue in the foreseeable future. Moreover, the study said that the need for high cost emergency and trauma services will also continue to increase at a fast pace (Khaliq, *The Saudi Healthcare System: A View from the Minaret*, 2012). Overall, Khaliq predicts that the KSA will continue many of the structures and methods used by the United States, but that it will encounter similar difficulties as well. This source also provides a bibliography of other sources for information about the KSA health system from a broad perspective.

Unfortunately, many of the sources about the KSA's health service industry from a broad perspective and written by academics are dated. For example, the 2002 study by (Al-Yousuf, Akerele, & Al-Mazrou, 2002) and the 2005 report by (Roland, 2005) only give us some information about the overall system from a perspective that is fifteen years old. However, these reports do substantiate the evolution of the health care system information provided in the official KSA's MOH report and make projections for the future which can be analyzed in the more recent 2015 MOH annual report. For example, in the "Organization of the Saudi health System" the authors discuss the country's efforts at immunization and to address diseases like malaria and measles (Joffe-Walt, 2010).

One of the more recent scholarly studies by a team of researchers in the KSA entitled “Access and barriers to healthcare in the Kingdom of Saudi Arabia, 2013: findings from a national multistage survey” (Bcheraoui et al., 2015) conducted a broad survey of 10,735 patients and stakeholders in the KSA. The study looked at what Saudi’s believe and experience about the KSA health system and identified several areas that need improvement. One of the biggest problems that patients and stakeholder identified were problems connected to diabetes and hypertension issues which are rising dramatically in the KSA. Once again, this study does not identify RTAs or TBIs as an issue among the Saudi population.

Another recent study by (Yusuf, 2014) provides still another contradictory list of data. For example, according to Yusuf there were 244 hospitals with 33,277 beds and 2,037 primary care facilities in the KSA. This is one problem with comparing the data on the KSA because there are no common or clear definitions used by researchers to identify primary care facilities, hospitals, and other surgeries. Also, in the Yusuf study they acknowledge that there is a trend toward more privatization and investments in this sector of the health system. They also identify new health problems facing the Kingdom like Obesity and diabetes and increasing amputations from these problems. Moreover, they warn about the growing population and still underserved rural sectors in the KSA. Again, this study does not discuss the problems of RTAs as a health concern or the growing numbers of TBIs resulting from these accidents (Yusuf, 2014).

These are some of the main sources identified in this part of the literature review that provide a broad overview of the history and present state of the health system in the KSA. We can see that there are sources from official institutions like the KSA’s Ministry of Health and international organizations like the World Health Organization (WHO) and other United Nation’s organizations. There are also reports from private organizations and academic studies

from public universities and schools. It seems clear that there are many contradictions in the literature about data and statistics on the KSA that should be noticed by researchers. As a result, researchers should not accept statistics or data about the KSA without further considerations and analysis.

Major causes of TBIs in the KSA. In Chapter one evidence is presented which shows that RTAs in the KSA are the major cause of TBIs in Saudi Arabia. However, it has also been shown that accurate data and statistics about TBIs in the Kingdom are not readily available nor is information about TBIs collected by the official MOH. As a result, much of the information claiming that most TBIs are caused because of RTAs is gathered from media sources and scholarly studies by universities and medical researchers. Some of the sources mentioned in Chapter one are (Aboabat, 2014), (Joffe-Walt, 2010), (Akhdar et al., 1998), (Al-Shammari et al., 2009), (Al-Habib et al., 2013), (Fossett, 2013), and (Ansari et al., 2000). In this section of the literature review other sources will be discussed in more detail.

One recent article that provides a timely and broad analysis of RTAs is the article “Road safety and road traffic accidents in Saudi Arabia: A systematic review of existing evidence (Mansuri, Al-Zalabani, Zalat, & Qabshawi, 2015).” This study by Mansuri reviewed all articles published over the past 25 years on road traffic accidents in the KSA and was conducted by the Department of Family and Community Medicine in Al-Madinah, KSA. The study found that between 1984-1989 83.4% of all trauma, including TBIs resulted from RTAs. Unfortunately, the authors point out that no such study has been conducted since that time. They say that this lack of recent information must be corrected by a new nationwide study including standardizing reporting techniques and methods.

This study also discovered that the most frequent types of injuries from RTAs were head and neck traumas followed by upper and lower body extremities. Their data shows that 4.7% of all annual deaths are attributable to RTAs while this figure does not exceed 1.7% in the United Kingdom, Australia, or the United States. Another important finding of the study is that 7% of accident victims sustain a permanent disability. The study also noted that there has been a rise in the number of pedestrians killed and injured because of RTAs. Other findings in the study show that there has been a 31.6% increase in deaths due to RTA's among males since 1997. It was also reported that 79.2% of patients admitted with spinal injuries between the years 1971 and 1997 had sustained their injuries as a result of a motor vehicle accident.

The study provides detailed information on what types of accidents occur in these RTAs. For example, driver error is the most common cause, in addition to what they refer to as some deplorable vehicles and road conditions (Mansuri et al., 2015). The study also noted that post-crash care is largely ignored and emphasized that there is a scarcity of local standardized information on RTAs. As a result, for researchers interested in more statistics about RTAs, this study can provide information on the ages of RTA victims and perpetrators, as well as data on gender, types of injuries, and types of collisions (i.e. head-on, side-on), prevalence of seat belt use, and time of year of the accident. The study shows that Ramadan is the most common month for accident occurrence and that 83.4% of all trauma admissions are the result of RTAs. This data shows that overall RTAs are responsible for most traumatic injuries in the KSA. However, the study does not differentiate between the types of trauma resulting in TBIs.

Another important study by Barrimah (Barrimah, Midhet, & Sharaf, 2012) looked at the specific epidemiological causes of RTAs. In other words, the study looked more at the data and statistical facts of the accidents than it did at the types of injuries caused by the accidents. As a

result the study provides a vast amount of information on mortality and injury rates by age, gender, types of vehicle, and other causes of accidents like speeding, underage driving, road conditions, etc. Nevertheless, the study is significant because it looked at all accidents that happened in the Qassim region of the KSA in 2010. The Al-Qassim Region, which is one of the thirteen administrative provinces of the KSA, has a population of 1,016,756 in an area of 65,000 square kilometers. The region is the seventh populated province and has 400 towns, villages, and cities. It is also home to a large Bedouin community with many scattered settlements. The capital of Buraydah is inhabited by 49% of the region's population.

One of the most troubling findings of the study was the discrepancy between official police accident reports and the information provided by the health care providers such as hospitals and clinics in the region. According to the "Reports of the Traffic Police Department" there were 18,623 accidents in 2010 involving 23,178 people which resulted in 2,025 major injuries and 369 deaths. In contrast, the health provider's reports showed there were 4,232 people injured and 1,054 deaths. These numbers show a great discrepancy which caused the authors of the study to write, "The inconsistency between police-reported data and health system data strongly suggests that active efforts to audit and monitor data quality are clearly necessary (Barrimah, Midhet, & Sharaf, 2012, p. 3)." Moreover, the authors acknowledge that RTAs are responsible for a significant loss of life, disability and injury for the population of the Qassim area in the KSA.

Other notable findings of the study found a mortality rate of 35.4 people per 100,000 population and that 50% died in cars, 33.3% died in 4 wheel drive cars, and 16.6% were pedestrians. Moreover, the study found that from the injuries reported they could estimate that 34.1% of the injuries resulted in a permanent disability and that 72.7% of the injured were aged

30-49. It is interesting to note that of the 34.1% of injuries resulting in permanent disabilities 36.4% reported body structure related disabilities and 63.6% reported body function related disabilities (Barrimah et al., 2012). Unfortunately, for the purposes of this research paper, this study does not explain what number of the 63.6% of “body function related disabilities” were TBIs.

Another study from 2014 substantiates the growing number of deaths and permanent disabilities from RTA’s reported in (Barrimah et al., 2012). The article “Blunt traumatic injury in the Arab Middle Eastern Populations” (Asim et al., 2014), which includes information on the KSA, says that blunt trauma from RTAs and other accidents such as falls from heights and falls of heavy objects cause significant permanent disabilities and death throughout the region. The study said that rapid economic growth which had attracted large numbers of expatriate workers from different nationalities has caused many of them to become the victims of traffic related pedestrian injuries in the Arab Middle East particularly in the rapid developing countries namely, Qatar, Kuwait, UAE, Bahrain and Saudi Arabia (Asim et al., 2014). Moreover, the study claims that Traumatic injuries from RTA are the third most common cause of disabilities world-wide and the second most common cause in the developing nations, including Saudi Arabia (Asim, et al., 2014). The inclusion of other causes for Blunt Trauma (BT) besides RTAs in this study shows that there are other types of accidents which may result in TBIs. Such accidents as falling objects or workers falling from heights are reported as contributing factors to the rising numbers of Traumatic injuries which they refer to as BT’s. Once again, this study does not differentiate between BT’s resulting in TBI’s nor explain which ones are caused by RTAs or other causes like workplace accidents.

It should be noted that this study, like many others, acknowledges the need for better record keeping and reporting of BT types of accidents. In fact, the authors of the study write,

“The lack of reliable information on these unintentional injuries is mainly responsible for the underestimation of this trauma burden. This knowledge deficit shields the extent of the problem from policy makers, leading to continued fatalities. These preventable injuries in turn add to the overall financial burden on the society through loss of productivity and greater need of medical and welfare services (Asim et al., 2014).”

There are some other sources of information about accidents which result in injuries that should briefly be discussed in this literature review. In a recent article in the *Saudi Gazette* (Gazette, 85% workplace injuries in construction, trade, industries, 2016) it is reported that 85% of workplace injuries occur in the construction and trade industries. The *Gazette* article reports that in 2015 there were 13,846 workplace injuries occurring in three sectors. It is reported that 7,179 injuries occurred in the construction sector, 2,696 in trade, and 2,122 in downstream industries. These statistics were compiled by the General Organization for Social Insurance of the KSA (GOSI). Unfortunately, the report does not have any data on how many of these injuries resulted in TBIs.

Reports of RTAs in the KSA, like those mentioned in Chapter one, regularly appear in the Saudi media. For example, a recent 2016 *Al-Arabiya* (Al-Arabiya, 2016) article cited a report by the Friends of the Red Crescent Committee which recorded 526,000 RTAs annually occur in the KSA. Moreover, it is reported that these accidents cost the government and the society in excess of 21 billion Saudi riyals. The article quotes the head of Red Crescent Committee Ahmad Al-Shaikha. Shaikha said, “We need to raise awareness about road accidents and be more socially responsible. It is truly a social issue. The government loses a lot of money

as a result of these accidents (Al-Arabiyah, 2016).” Shaikha reports that the Red Crescent Committee has started a comprehensive program to train more paramedics to respond to the accidents and is lobbying the government for stricter traffic regulations and more improvements of dangerous roadways. Moreover, he reports in the article that the Committee will be supporting projects that promote more social responsibility and supporting advertising campaigns to encourage more responsible driving, seat belt use, and safety education (Al-Arabiyah, 2016).

A November 2016 report in the *Jeddah News* (News, 2016) attests to the rising crisis of RTAs as reflected in the amazing 400% rise in car insurance. The article says that insurance providers say costs are rising because of the reckless driving and deadly rate of accidents. The industry reports that in 2016 road traffic accidents could rise to an unprecedented 1.1 million incidents. The newspaper article cited other sources saying that insurance companies have suffered severe losses causing the increases in insurance premiums. Saudi drivers have been complaining about the increases and it is reported that they blame persistent road works which have “affected the smooth flow of traffic.” The article reports that monthly insurance premiums now cost as high as 2,000 Saudi riyals or \$533 dollar monthly.

It should also be noted that there are other causes of brain injuries which are called Acquired Brain Injuries (ABIs) and often confused with TBIs. In recent years in the KSA there has been an alarming increase in the number of Saudi’s suffering from diabetes and stroke. This “new” epidemic has been recognized by the government and there have been many new reports and studies about the matter. One recent 2014 study (Robert & Zamzami, 2014) surveys much of the recent literature and observes that in the KSA the incidences of stroke are becoming a rapidly increasing problem and an important cause of illness and deaths. Moreover, they acknowledged that survivors of stroke are often left with severe mental and physical burdens. In addition, as

with information about TBIs in general, the authors wrote that research regarding the incidence, prevalence and the socio-demographic properties of stroke are still insufficient due to a major lack of appropriate studies in these specified areas (Robert & Zamzami, 2014). According to this review of the available literature on stroke in the KSA, 79% of the strokes are ischemic type strokes. These strokes often result in brain impairment of some type which require specialized care and treatment. Unfortunately, this study does not have any data or statistics on the number of these strokes resulting in brain injuries requiring specialized treatment.

Based on the data and information there is a clear connection between RTAs and the rising numbers of TBIs in the KSA. Also, in the data there are some reports and a few studies of the increases in stroke which cause different types of brain injuries. Moreover, there is evidence in the data that construction accidents like falls which result in TBIs. As a result, we can speculate or theorize that like in all countries, TBI in the KSA are caused by several different things. However, it is abundantly clear that because of the lack of data about specific causes of TBIs, that there is no way to ascertain exactly the different percentages of TBIs causes and no centralized data back to collect and analyze the data. This lack of centralized data is the first major step that the KSA must address in order to proceed with a more comprehensive and nationwide treatment and prevention plan for TBIs in the Kingdom.

Critical and Long-Term Care for TBIs in the KSA. According to Dr. Aboabat the availability, accessibility and utilization of pre-hospital and emergency care are the major determinants for survival and outcome in TBIs (Aboabat, 2014). He reports that since the majority of accidents happen outside of the major cities, what he refers to as ‘intercity’, away from the large urban hospitals capable of providing immediate trauma care that there are more casualties and consequences from TBIs than necessary. Moreover, he reports that in the KSA

there are a limited amount of competent neurosurgeons and well equipped operating facilities capable of dealing with these complicated injuries and cases. As a result, he speculates that this explains the higher death rates and poor outcomes in the ‘intercity’ areas of the country. In addition, he presents some statistics which show that RTA victims have a better chance of survival if the accidents actually happen in the city as opposed to outside of these places without good hospitals.

It is widely reported by Aboabat and others that the KSA is working to improve the country’s immediate trauma care especially in the area of TBIs. This is reflected in the literature by noticing the large amount of articles being published regarding emergency medical treatments for TBIs in the KSA in many different medical journals. Although this study is not focused on medical treatment for immediate post-accident TBIs it should be noted that the literature shows this is an area of growing concern. For example, there are many articles with titles like “Critical care management of severe traumatic brain injury in adults (Haddad & Arabi, 2012)”, “Pre-hospital and initial management of head injury patients: An update (Chowdhury, Kowalski, Arabi, & Dash, 2014)”, and “Measuring the Quality of Care for Patients with Traumatic Brain Injury (Arabi, Alsolamy, & Al-Qahtani, 2016)” which discuss different medical approaches and immediate trauma care practices for first responders, as well as Saudi trauma care surgeons. There are also many specialized and technical medical articles about studies that have been conducted in the KSA regarding these issues such as “Detrimental effects of albumin resuscitation: Fluid resuscitation for patients with traumatic brain injury—potential mechanisms behind the detrimental effect of albumin resuscitation (SAFE TBI II) (Cooper, Detrimental effects of albumin resuscitation, 2010)” and one by Saudi researcher Hosam Mustafa Kamal, et.al entitled “Fall of platelet count in children with traumatic brain injury: is it of value? (Kamal,

Sammou, Mardini, & Zaitoni, 2011)” which acknowledges that trauma is the leading cause of mortality and morbidity among young age groups in Saudi Arabia.

Also, according to Dr. Aboabat, the KSA is working to improve the country’s long term rehabilitation services for TBIs. Although, he acknowledges that “rehabilitation services have come a long way” he emphasizes that “the availability of intensive inpatient rehabilitation programs continues to be limited to a few major hospitals in Saudi (Aboabat, 2014).” At the time of his article in 2014 there was only one hospital in Saudi that was certified by the Commission for Accreditation of Rehabilitation Facilities (CARF). This hospital is the Rehabilitation Hospital of King Fahad Medical City (RH-KFMC) in the capital of Riyadh. This hospital provides a holistic approach to the long term treatment of TBI patients. However, according to Aboabat in the five year period of 2008-2013 only a total of 279 brain injury patients were admitted and rehabilitated at the facility. He noted that of these patients their functional status as measured by the Functional Independence Measure (FIM) score was 53.2 on admission, 79.9 on discharge and an average FIM change of 27 points compared to 56.6, 87.7 and 31 points in USA respectively (Aboabat, 2014). He also noted that Saudi brain injury patients have to wait for long periods of times to be admitted to this facility and that many patients never receive any type of specialized TBI treatment at all.

Dr. Aboabat says that the reason for the limited services is partly attributable to the poor awareness of primary medical and surgical teams about the importance and availability of comprehensive inpatient rehabilitation services, as well as the limited number of available inpatient rehabilitation beds in the KSA. He also cited other contributing factors for why TBI treatments are lagging so far behind more developed countries like the USA and Great Britain. He said that there is inadequate training and supervision of clinical staff and the failure to follow

policies or protocols have also reportedly contributed to most events. Moreover, he pointed to the long wait periods for treatment as being a major contributing feature of the lower outcomes of treatment as reported in western countries. He also said that there is a lack of continuity of care in other community based facilities which results in rehabilitation facilities having to play a major role in addressing patient needs (Aboabat, 2014).

Dr. Aboabat, who is an expert on TBIs in the KSA, recommended that the Saudi government needs to do many things. First, he said that the government must establish a National Registry System for neurotrauma that provides related information required for accessing the true needs and developing a comprehensive rehabilitation and extended care plan. In addition, the government needs to increase its efforts at prevention in an effort to save lives and prevent disabilities. Dr. Aboabat has published a four point plan for improving and optimizing TBI rehabilitation outcomes and reducing the average length of stay in intensive inpatient rehabilitation program. His four point program recommends the following:

1. Improving pre-hospital and emergency care and prevention of secondary complications.
2. Increasing specialized rehabilitation inpatient capacity in the Kingdom.
3. Facilitating and ensuring early referral to specialized rehabilitation programs.
4. Improving the continuity of care in the community to reduce the burden on the health care system (Aboabat, 2014).

Since the publication of Dr. Aboabat's article in 2014 another facility in the KSA has been certified by CARF. In an interview with Kelly Silberschlag (Silberschlag, 2016) who is the Resource Specialist for the Medical Rehabilitation section at CARF International she reported that the Sultan Bin Abdulaziz Humanitarian City in Riyadh's Rehabilitation Program had

recently been accredited by her organization. This means that there are now two officially CARF certified in the KSA and that there are some others working to become CARF certified as well. According to Silberschlag the accreditation means that these facilities have a uniformed treatment plan which can be monitored and analyzed. This helps CARF design new treatment options and can help them study the successes of the programs based on uniformed standards and principles.

According to the official web-site for the new Sultan Bin Abdulaziz center the “Comprehensive Integrated Inpatient Rehabilitation Program” (CARF, 2016) at their facility is a program coordinated and integrated with both medical and rehabilitation services. The site reports that

The scope and intensity of care provided are based on a medical and rehabilitation pre admission assessment of the person served. An integrated interdisciplinary team approach is reflected throughout all activities. To ensure the transparency of information the program provides a disclosure statement to each person served that addresses the scope and intensity of care that will be provided.

The site explains that the treatment program is jointly designed in collaboration between team members, medical staff, and the client with the individual’s resource needs at the center of the therapy and rehab plan. This means that each person served drives the appropriate use of the rehabilitation continuum of services, the provision of care, the composition of the interdisciplinary team, and discharge to the community of choice (CARF, 2016). Part of the methodology used by CARF involves the use of uniformed reporting which identifies and defines the services provided, intensity of services, frequency of services, and variety of services, availability of services, and personnel skills and competencies. Moreover information about the

scope of services and outcomes achieved is shared by the program with stakeholders (CARF, 2016). These reporting systems and uniformed treatment strategies and methods are also designed to help TBI programs to compare their outcomes and programs with others offering similar services across the world. The CARF provides its members with data and consulting designed to improve the various programs overall outcome performance and help them with timely data and research about improving their TBI facility.

To date these are the only two CARF facilities in the KSA and this means that many thousands of TBI victims are being treated in other types of facilities like nursing homes and others being helped in their own homes by extended family members. According to Silberschlag there is little data or information about the fate of these TBI patients nor any studies indicating the outcomes or problems because of the lack of professional treatment. Moreover, because the KSA does not have official information on TBIs there is no way to determine how many people in Physiotherapy programs, hearing and speech programs, as well as Occupational Rehabilitation programs are also TBI victims. Overall, this lack or void of specific information is a major problem facing TBI care providers and long-term care facilities.

A discussion of disability in the KSA. In order to talk about treatment and future options for TBI patients and victims in Saudi Arabia it is important to discuss the overall issue of disabilities in the country. This includes such things as public perceptions of disability, government rules and regulations about the treatment of the disabled, current disability research in the KSA, and other disability related topics. In fact, in the existing literature on the topic of disabilities in the KSA there are several studies and sources. For example, there are studies with titles like “Mood problems of mothers with disabled children in Saudi Arabia: A preliminary prospective study (Al-Eithan, Robert , & Al-Saeed, 2010)”, “Quality of life in females with

spinal cord injury in Saudi Arabia (Al-Jadid, Al-Asmari, Al-Kokani, & Al-Moutaery, 2010)”, and “Pattern of disability among patients attending Taif Rehabilitation Center, Saudi Arabia (Al-Sheri, Farahat, Hassan, & Abdel-Fattah, 2008).”

One article that provides a general discussion and perspective about the issue of disabilities was written by Maher S. Al-Jadid. (Al-Jadid, 2013) In his article entitled “Disability in Saudi Arabia” Al-Jadid has a clear description of how disability is defined in the Labor and Workman Law of Saudi Arabia and how people with disabilities are supposed to be treated under the law of the land. According to Al-Jadid disability is tied to the ability to be able to work at a productive job in the Kingdom. In other words, any person who cannot continue for any reason to achieve or perform a suitable job or who has diminished skills as a result of a physical or mental condition is defined as disabled. In the article Al-Jadid claims that almost every family in the KSA has a family member classified as disabled. Moreover, he quotes a World Health Organization (Organization, International classification of functioning, disability and health, 2001) study that says between 2-4% of the Saudi population is disabled. Based on this number Al-Jadid calculates that there are as many as 1,400,000 disabled people in the KSA. He also says that all of these people are required under Islamic law to be cared for either by their families or the government of the KSA. He said that under Sharia law, “Persons with disabilities have the right to live with dignity and benefit of welfare. A sound living and the ability to engage into all sectors of society assured through providing rehabilitation and healthcare services for them (Al-Jadid, 2013, p. 456).”

Also in the article Al-Jadid provides a significant amount of other information about disabilities. For example, according to his report RTAs, cerebral palsy, stroke, and head and spinal cord injuries are the major causes of disabilities in the KSA. He says that another major

cause of disabilities is the problem of consanguinity in the country. According to Al-Jadid 56% of all Saudi married couples are at risk of consanguinity problems that often result in their children having severe and disabling birth defects. Moreover, another 22.4% of marriages are between second cousins which also poses problems of genetic issues for their children.

One thing in the article that is important for researchers of TBI treatment in the KSA to understand is the way people with disabilities have been treated in the KSA. He says that psychological investigations have clearly shown that disabled people have been discriminated against, treated differently, and often time have been ignored by their families. This means that people with disabilities were kept at home and away from the larger community and family. Many were not allowed to attend family or social gatherings and school, or go to the Mosque because of a stigmatism against people with disabling problems. He says that in many people's perspectives the disabled are seen as shameful and that they reflect badly on family heritage. He also reported that there have been suicides committed by people with paraplegia or quadriplegia in the KSA which is seen as a great family shame.

However, according to Al-Jadid's study many of these ideas and perspectives are beginning to change in the KSA. He says that new studies show that rehabilitation is starting to become a more widely embraced and encouraged practice in the Kingdom. He says that the government is starting to promote advertising campaigns to educate the Saudi people about disability and disabled services in the Kingdom. He also says that there are more rehabilitation centers and more research into these areas. Moreover, in relation to the prevention of TBIs caused by RTAs he acknowledges that the government has been working diligently to reduce these accidents through the passage of new laws and more public relations activities.

In the study Al-Jadid says that there are several major hurdles to improving the conditions of disabled people in the KSA. Some of these are improving reporting and information services about disability by conducting countrywide data from scientific demographic surveys and dramatically increasing the low number of long term care facilities and programs in the country. Moreover, he says that it is critical to improve the gaps between current ideas and knowledge about disability with the facts about the nature of disability.

In the literature review there are also many sources which substantiate the changes taking place in the KSA in regards to attitudes about the disabled. For example, in a recent news article in the *Saudi Gazette* (Gazette, Your job or your disabled child: A tough choice, 2015) it is reported that despite the large amount of government spending on helping people with special needs that there is still a major shortage of centers dedicated to caring for the disabled in the Kingdom. The article says that there is a huge need for more centers to work with autistic children and more centers are needed to provide services to the physically challenged. Changing attitudes can also be seen in recent developments and actions taken by the government. For example, in the new multi-billion dollar King Abdullah Sports City completed in Jeddah in 2014 there are 308 special seats for the disabled (Wahab, 2014). The advertising for the stadium proudly proclaims that in comparison there are only 486 VIP seats. These types of changes and reports are recognized as major changes in thinking taking place in the KSA about disability issues (Wahab, 2014).

In the academic literature there are many sources which report about changing attitudes and new initiatives in the KSA regarding disability. In the *Saudi Medical Journal* article “An overview of the Prince Salman Center for Disability Research: Scientific Outcomes (Al-Odaib & Al-Sedairy, 2014)” it is reported that the government is preparing a new proposal establishing

new codes and laws for persons with disabilities. Under the new code a new comprehensive national system for people with disabilities will be established. Among the 16 articles summarized in the report are new rules and regulations guaranteeing equal access for the disabled to all government buildings and new construction, healthcare services, education, transportation, employment, social participation, and sports facilities. Moreover, the government will streamline and coordinate manpower for education and training in the field of disability and promote experience exchanges with other countries. The new code will also establish a new Supreme Council of the Affairs of Persons with Disabilities with a seat in the Prime Minister's Council.

Another area of disability that is changing in the KSA are issues related to drug and alcohol abuse. Even though Saudi Arabia is an Islamic country where alcohol and illegal drugs are banned, the Saudi government has begun to recognize the need to address these issues. In an article by the Drug and Alcohol Rehabilitation Group DARA of Thailand (Alcohol and Drug Rehab Saudi Arabia, 2016) it is reported that according to Dr. Khaled Al-Mirghalani of the Saudi Ministry of Health (MOH) the Kingdom currently has 18 hospitals that have services for mental patients and drug addicts. Moreover, it is reported that the government plans to build another 500 bed facility for mental health and substance abuse issues in Riyadh. According to the report there is a new problem in the KSA with a stimulant known as Captagon that is highly addictive and recognized as being regularly abused by many Saudis. In addition, the report says there is rising evidence of heroin and cocaine abuse although it still remains low in comparison to other countries in the region. This is good evidence that even issues of Substance Abuse Disorders (SUDS) are beginning to be dealt with within the KSA.

Overall, the sources reviewed in this section show that there are still many cultural and social prejudices against people with disabilities in the KSA. However, the evidence shows that these attitudes are starting to change and that the government is taking a proactive role in improving the lives of Saudi's disabled citizens. Moreover, with the adoption of the new codes on disability expected to take place in 2017 it would not be unreasonable to predict that changes regarding the status of the disabled and TBI victims in the KSA will continue to improve and their services expanded.

Counseling issues from an Islamic perspective. In the field of rehabilitation counseling and other types of counseling specialties the issue of multi-cultural awareness and issues of diversity and cultural sensitivity are increasingly emphasized. This is evidenced in the curricula and materials used in educational training programs in Rehabilitation counseling at universities across the world. As a result, it is important to briefly discuss the emerging field of Islamic counseling and its importance for those interested in working with TBIs in Saudi Arabia. Moreover, it is especially important for non-Muslim groups or individuals interested in developing programs in the KSA or working there in the future to have some ideas of this developing specialty and perspective within the counseling world and to have some knowledge of the vast literature available in the field.

According to information from the American Counseling Association there are hundreds of texts and tools designed to improve counselor's culturally competent practices. In fact, the organization has published a series of books entitled *Multicultural Issues in Counseling: New Approaches to Diversity* (Lee, 2012) designed for professional counselors to incorporate new insights into their practices and broaden their scope of multicultural counseling theory and practice. In the latest edition of this series there is a chapter on "Counseling Arab Americans"

highlighting the work of several Muslim-American professional counselors with their contributions to this emerging field.

As early as 2004 counselors at American universities began to recognize the need for more basic information about helping the growing numbers of Muslim students with mental health and substance abuse problems and the way rehabilitation therapy could be applied to this population. The article “Islam 101: Understanding the Religion and Therapy Implications” (Ali & Liu, 2004) by researchers Saba Rasheed Ali and William Ming Lui offers a good primer for counseling professionals who are not familiar with the religion or cultural aspects of Islam. The article, which was written only a few years after the events of 9/11, says that in light of the 9/11 tragedy there was a need to address many dangerous stereotypes about Muslims and also to help counseling professionals gain a basic knowledge of Islam. This article provides some foundational information which psychologists and counselors will need to help Muslim clients effectively and compassionately. There is information about Muslim cultural values, gender role expectations, immigration issues relevant to counseling and therapy, and behavioral prescriptions from an Islamic perspective.

Since that time there are many new books, including textbooks, entirely dedicated to Islamic counseling theories and practices. For example, a new book by G. Hussein Rassool entitled *Islamic Counseling: An introduction to theory and practice* (Rassool, 2016) has been published which offers a broad overview of the many contemporary problems and issues facing counselors in the new global world. According to the author the rapidly growing Muslim population of over 8 million people in the United States and other western societies makes it imperative for counselors to develop a better understanding of Muslim’s psychosocial and spiritual needs and concerns. Rassool explains that the Muslim community is experiencing

Islamophobia, microaggressions, prejudices, hate crimes, and social exclusion because of their cultural and religious identities. He says that as a result evidence shows that there are indicators of a corresponding rise of Muslims in need of psychological and counseling services. Since more counselors are coming into contact with Muslim clients Rassool says that it is not unusual for counseling professionals to find themselves at a loss to intervene with these clients successfully.

In his book Rassool addresses many of the complex problems that counselors, both Muslim and non-Muslim, will face in their professional practice. For example, Rassool explains that from a Muslim perspective all cures only come from God (Allah). He discusses how to explain to Muslim's that seeking psychological and spiritual health does not conflict with Islamic teachings or seeking help from God. He explains that Islamic tradition and practice takes a holistic view to health and that consequently physical, mental, and spiritual health cannot be separated. He says that this concept is especially important for counselors working in the area of Rehabilitation counseling. Moreover, it should be noted that this book has chapters on Humanistic, Cognitive behavioral, Solution-focused, and Psychoanalytical therapy and counseling from an Islamic perspective. There are also chapters on counseling alcohol and drug abuse, as well as a chapter on working towards an Islamic counseling practice model. Overall, this work provides a timely overview of the current thinking and practice in the field of Islamic counseling.

Another recent book that provides new insights based on practice and experience is the 2012 *Counseling Muslims: Handbook of Mental Health Issues and Interventions* edited by Sameera Ahmed and Mona M. Amer (Ahmed & Amer, 2012). According to the editors of the book this was the first comprehensive survey of the issues confronting clinicians or researchers attempting to understand the mental health issues that may impact the Muslim community.

According to the editors the book is a collection of interventions and clinical issues that have not been given much attention in the past such as counseling for sexual and substance abuse issues, and the use of humanistic, home-based, and community interventions. Each of the chapters presents a similar format that focuses on both theory and real practice experience written by eighteen different professional Muslim counselors. The book also attempts to dispel many common prejudices, myths, and stereotypes about Muslims and has a detailed discussion of both ‘within group’ and ‘between group’ differences that offer the reader a broad representation of the various Muslim cultures around the world and in the United States. For non-Muslims the book has a discussion of Islamic history and religious ideas, including an introduction to concepts of Islamic law, culture, and society. In addition for both Muslim and non-Muslim counselors the book offers a lengthy discussion of counseling related issues as they pertain to the basic tenets of Islam and sources of Muslim legal codes.

It should be noted that for counseling professionals interested in developing a deeper theoretical and philosophical understanding of Islam and counseling issues that there are many sources available offering these insights and discussions. In fact, there is an entire periodical entitled *The Journal of Religion and Health* which provides detailed and in-depth discussions of these complex issues. For example, one article entitled “Islamic Approach to Counseling” by Salasiah Hanin Hamjah and Shakirah Mat Akhir (Hamjah & Akhir, 2013) reviews the findings of a study which looked at issues related to the faith of Islam and the results of counseling experiences of Muslim clients. The study concluded that applying religious elements of Islam to Muslim clients was critical to successful counseling practice. This in-depth study looked at different Islamic counseling approaches as applied to 36 different clients by 9 different counselors and evaluated outcomes of the various methods used. Overall the study showed that

the Islamic approaches applied in the survey could be categorized into three main aspects. These were aqidah (faith), ibadah (worship/devotion to God) and akhlaq (moral code). For devote Muslim's the study claims that these approaches are in line with Islamic teachings as contained in the Holy Quran and the al-Sunnah.

It should also be noted that in the United States today there are a growing number of professional organizations providing membership and a broad number of services for Muslim counselors. One group, The Institute of Muslim Mental Health publishes an academic, peer reviewed scholarly publication called *The Journal of Muslim Mental Health* (About, 2016). Some recent titles of articles appearing in this journal are "Prevalence of Risk Behaviors among U.S. Muslim College Students", "Mental Health Stigma in the Muslim Community", and "Mental Illness Recognition and Referral Practices Among Imams in the United States." The Institute also holds regular annual conferences around the United States, offers workshops and training programs, and has a national directory of Muslim counseling professionals, and funds research projects for students and junior investigators interested in conducting research in the field. Also, this group provides networking and support services for Muslim counselors working in their home countries and resources for improving their access to information.

Another organization called *MentalHealth4Muslims* operates a website highlighting recent developments and research into issues such as Addiction, Health and Wellness, Parenting, Relationships, and Marriage and Divorce (Sekandari, 2016). The organization offers an online forum where Muslim and non-Muslim counseling professionals can exchange ideas and discuss issues relevant to meeting the needs of their Muslim clients. Moreover, for educational purposes the organization offers many pod-casts, videotaped lectures, and timely articles contributed by their members and counseling professional around the world. In addition, the site also offers a

wide variety of books on issues ranging from Autism to Muslim marriage. There is also an advocacy organization called the *Muslim Wellness Foundation* (Rashad, 2016) that offers training for Imams and Muslim communities around the country on issues of mental health and the Muslim community. One of their projects is called Mental Health First Aiders and has certified hundreds of community members and Imams to have better mental health awareness. They provide concrete tools to address rising needs in the Muslim community across the country with issues like mental illness, addiction, and trauma.

These are just a few of the resources and some literature about counseling from an Islamic perspective. This information could help individuals or groups interested in working in the KSA gain more knowledge and insights into working with Muslim clients from an Islamic perspective.

Chapter 3

DISCUSSION AND IMPLICATIONS

Summary and synthesis

After reviewing all of the sources in the literature review it is very clear that road traffic accidents (RTAs) in the KSA are a major problem and are the major factor contributing to the rise of TBIs in the country. This fact is substantiated not only by the official Traffic Safety Committee of Saudi Arabia, but also by organizations like the World Health Organization. Moreover, it is reported about in independent media sources, as well as in studies by independent researchers like (Al-Habib et al., 2013).around the world. As a result, one could summarize that these RTAs are responsible for thousands of deaths each year and even more injuries. In fact, one study by (Joffe-Walt, 2010) reports that there are over 611,000 injuries annually with 7% resulting in permanent paralysis, amputation, or disabilities and yet, other studies (Al-Habib et al., 2013).claiming that over half (56.7%) of the injured suffered TBIs.

Unfortunately, it is also evident from the literature review and observers like (Aboabat, 2014) that it is impossible to accurately gauge how many RTAs directly result in TBIs, because the government does not have a uniformed reporting or data collecting system. This lack of data is also recognized as a major problem by other sources like (Akhdar et al., 1998). Moreover, we see in the detailed study of RTAs in the Saudi province of Al-Qassim that there is a major discrepancy of accident reports filed between police sources and hospital sources. These discrepancies only add to the difficulty in fully understanding the rates of TBIs resulting from road accidents.

It is also clear from information in the literature review that the government of Saudi Arabia is beginning to more aggressively address the problem of RTAs by implementing new

laws which require such things as the use of seat belts, motorcycle helmets and infant car seats and more rigorously enforcing speeding and reckless driving laws. In addition, we see where the government has invested in more public education campaigns about the dangers of reckless driving and begun more driver education programs across the country. They have also invested more resources in public transportation and a campaign to encourage walking and the use of public transportation services.

However, it is also noted that one of the major causes of reckless driving resulting in RTAs and subsequently many debilitating TBIs has gone largely ignored by the Saudi government. This is the culture of dangerous driving activities behind the wheel among young Saudi males. The information in the literature review and the introduction suggests that these problems are being ignored by the Saudi government because they reflect on much deeper structural and cultural problems in the society.

It is also clear from the literature review that there is a serious lack of professional long term care facilities and rehabilitation facilities for TBI victims. The literature attests to long waiting periods for placement in the existing rehabilitation hospitals or programs and recognizes that these delays only cause more problems and patient suffering. We see in the literature review that at the present time there are only 2 accredited CARF rehabilitation facilities and that most TBI victims are either being cared for at home or in nursing home types of facilities with little focus on providing rehabilitation therapy.

Perhaps, one of the most promising developments found in the literature review is the changing attitudes within the Saudi government toward the treatment of the disabled in the Kingdom. The report by (Al-Odaib & Al-Sedairy, 2014) shows that the Saudi government is in the process of adopting a new code of laws and regulations establishing a bill of rights for all

disabled Saudi citizens. The articles in the proposed new code will establish mandated new access to services for disabled citizens, require all new buildings to be handicapped accessible, guarantee equal access to education, employment, and training, as well as create a new Supreme Council of the Affairs of Persons with Disabilities within the Prime Ministers Council. All of these things are substantiated in other sources like (Al-Jadid, 2013). Moreover, there are reports that new services and facilities for the treatment of TBI victims will also be positively impacted because of the government's new commitment to providing more services to the disabled in the KSA.

Discussion

Based on an analysis and careful reading of the sources in this literature review I believe that it is evident that RTAs in the country of Saudi Arabia are a major problem and that they are the number one cause of the rising incidences of TBIs. As shown in the literature review this fact is substantiated in both official government sources and independent studies by groups and organizations outside of the country. The literature review also has many sources that show that the government of the KSA is trying its best to respond to the problem by implementing new laws and imposing new fines and penalties against dangerous drivers. All of these things are positive steps and they may help reduce the number of accidents on Saudi roads and thus lead to less injury and consequently TBIs.

From the literature review it is also clear from some of the reports, including by Saudi professionals and observers, that the government's response to RTAs is missing one of the key points underlying these activities. As we read observers like (Fossett, 2013) and (Joffe-Walt, 2010) show that the dangerous driving sub-culture embraced by many young Saudi men is partly the result of deeper societal issues. Some of these issues such as the separation of boys and girls

and a restrictive culture that does not have many outlets for young people to have fun are at the heart of the dangerous driving activities taking place across the KSA. If these observers are correct then the government will have to also begin to consider how to implement some changes into their policies to help reduce young Saudi men's habits of participating in these deadly activities.

As regards the central issue of this paper which is how to improve the treatment and care of TBI victims, the evidence in the literature review clearly shows there is a critical lack of detailed and trustworthy information about many aspects of TBIs. We have seen from the testimony of one of the country's experts on TBI Dr. Aboabat (Aboabat, 2014) that the KSA must establish a National Registry System for neurotrauma that provides related information required for accessing the true needs and developing a comprehensive rehabilitation and extended care plan. This should really not be that difficult to achieve especially if the government and its Ministry of Health recognizes the need and takes bold action. This could be achieved perhaps, by working with the experts like Dr. Aboadat and the Ministry of Health to implement a National Registry System similar to those that exist in the United States and other countries around the world. In other words, there are already systems that exist around the world which could be a model for the KSA.

Other recommendations made by Dr. Aboabat (Aboabat, 2014) such as increasing specialized rehabilitation inpatient capacity in the KSA and facilitating and ensuring early referral to specialized rehab programs will probably take much longer. As reported in the literature review there are presently only 2 CARF accredited facilities in the entire country providing specialized services for TBI patients. Although CARF claims that there are other facilities planning to open TBI services in the future (Silbershlag, 2016) these facilities will only

provide a few more beds and be able to help a very limited number of patients. Indeed, these developments are good news for the Kingdom and TBI patients, but the government will have to be much more proactive in order to meet the needs of the thousands of Saudi's needing services.

One way that the care of TBI patients might be dramatically improved is when the government officially adopts the new codes and bill of rights for disabled people and establishes the Supreme Council of the Affairs of Persons with Disabilities within the Prime Ministers Council. This office will have much power to implement new programs and influence many new developments in the care of TBI patients in Saudi Arabia. I would highly recommend to follow the developments of this position and see what the government plans to do and also to see who the government appoints to be the director or leader of this organization. In Saudi culture and society these types of positions have great power and this new organization could greatly impact and improve the lives of all TBI victims. Moreover, this proposed new organization will probably have great funds and be able to influence a new period of building and development for TBI type care facilities.

Also, in the literature review there are some sources that discuss the changing attitudes in the KSA regarding the care and treatment of people with all types of disabilities. These changes combined with the proposed new Supreme office for people with disabilities suggest that the government is planning to implement a new period of public awareness and create many new initiatives to improve the lives of people with disabilities. As a result, this is a good time for professionals like Dr. Aboabat and others to be in a position to influence public policy and push for major reforms and developments regarding all aspects of TBI in the country.

Conclusion

TBIs are one of the major challenges facing the Saudi health care system. The evidence suggests that the incidences of TBIs because of automobile accidents, which is the major cause of the problem, continues to rise despite the government's efforts to curb RTAs. Moreover, the evidence is clear that in the entire Kingdom there are presently only two specialized CARF approved facilities offering services to TBI patients. This means that many TBI victims are being cared for at home or lingering in government nursing homes. Unfortunately, it is also clear that there is a lack of trustworthy data and information about TBIs which could be used by the government to design and build an effective nationwide care system for TBI victims.

This research paper has shown that there are many solutions available for dealing with TBIs that exist around the world that could be implemented by the KSA and adopted into their system. One of these would be a data collection system that uniformly identifies, tracks, and analyzes all TBI data in the country. Another thing that the government must continue to do is fund and build more centers for the care and rehabilitation of TBI patients. In addition, the government needs to continue to promote the education of health care professionals, including rehabilitation counselors and experts in TBI care and rehabilitation. Also, the government needs to continue its broad efforts to stop the dangerous driving activities and habits that are the main contributor to TBIs. Moreover, there needs to be more studies and research into the linkages between RTAs and TBIs. Overall, the data needs to be improved and analyzed by even more researchers in an effort to devise a comprehensive nationwide TBI agenda and program.

These observations above show that there is plenty of room and need for more research in the future. This entire area needs to be studied further and made available to other researchers, students, government agencies, and policy makers. There also needs to be an advocacy

component to the work of TBI rehab professionals in Saudi Arabia. In other words, the professionals working with TBI patients and in other areas related to TBIs need to encourage the government to improve and expand TBI services. Moreover, they need to organize into a professional organization that could influence the future work of the Supreme Council of the Affairs of Persons with Disabilities within the Prime Ministers Council. This is one area that I would be interested in doing more research about in the future, because there needs to be a TBI health care and rehabilitation care type of organization within the country of Saudi Arabia.

In conclusion, there are many areas and many research topics about TBI that need further investigation in the KSA. Although, the country has come a long way over the past decade there is still much work to be done and the need for much more coordination and expansion of the existing services pertaining to TBI. Also, according to the CARF accreditation organization the Saudi government is planning to build more facilities for TBI in the future. This means that there will continue to be a need for rehabilitation professionals in the Kingdom and many new opportunities for both people and organizations that want to improve the lives of TBI victims. This research paper has tried to look at TBI in its entirety and discuss and investigate many of the connected issues related to TBIs. This information may be very helpful to future rehab professionals planning to work in the KSA and also for researchers interested in conducting more research about TBIs in the Kingdom.

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