UNITED ARAB EMIRATES
MINISTRY OF HEALTH & PREVENTION

PUBLISHED RESEARCH ON NON-COMMUNICABLE DISEASES AND INJURIES IN THE UNITED ARAB EMIRATES 2007-2016

Ministry of Health and Prevention- Statistics and Research Center

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WORD FROM THE UNDERSECRETARY

The Ministry of Health and Prevention aims to achieve a world-class healthcare system by providing excellent services delivered in a sustainable environment. The Ministry has been undertaking key strategies to address chronic diseases in the country such as diabetes, cancer, stroke, and heart illness, while looking at expanding these health services and providing financial support.

Innovation is important in building a first-rate health system and establishing policies for effectively treating chronic diseases. We are continuously carrying out research in the field of innovation as well as finding ways to introduce it on a wider scale. Additionally, we are seeking ways to improve health research and its effectiveness; propose strategies to enable us to plan and enact health policies; and know the latest indicators and obtain analytical tools for the early detection and prevention of diseases according to the highest levels of transparency and reliability. The Ministry will establish a research environment to improve health system outcomes and reduce costs. These efforts are aligned with the Ministry's strategies for promoting individual and community health and providing comprehensive services in accordance with existing policies, laws, programs, and local and global partnerships.

Moreover, we are working to improve the quality of life and ensure individual and community well-being. The high prevalence of chronic diseases, including cancer, heart disease, high blood pressure, and diabetes, always results in social and economic burdens, thereby delaying the achievement of our overall development goals.

To achieve our goal, effective supervision and monitoring of our progress and having the right data are all essential. Systematic risk factors monitoring and vigorous records are essential. By carefully analyzing the data, the UAE will be able to prioritize vital resources and develop sound health strategies.

DR. MOHAMMAD SALIM AL OLAMA
Undersecretary of the Ministry of Health

WORD FROM THE DIRECTOR OF THE STATISTICS AND RESEARCH CENTER, MOHAP

As a research director of the Statistics and Research Center, I am pleased to present this Annual research report 2007-2016. The Research section under Statistics and Research Center of MOHAP has considerably taken a leading role in providing access to high quality, evidence-based information and improving the transfer of knowledge between researchers, scientific professionals, policy makers, medical practitioners, and institutions generating an environment to foster excellence in research. As it is well known that Non-communicable diseases for instance, cancers, diabetes, and cardiovascular diseases have turned out to be the major cause for death and disability in adults. It mainly constitutes developmental and public health challenges for the country. We have aimed to synthesize theoretically relevant research conducted on non-communicable diseases from the year 2007-2016 for lay individuals, health policy makers, researchers, and health care providers with an interest in burden of NCD's in United Arab Emirates. We discussed and highlighted the risk factors, prevalence, diagnosis and management context of NCD's, since the rising prevalence of these issues imposes a grave implications for the government, healthcare providers, families and individuals. Furthermore, we have also identified the current and future challenges of this burden for offering future policy, practice, and research.

This report is presented in 8 sections. These sections presents syntheses of studies undertaken on chronic non-communicable conditions that are of importance for public health. These conditions of focus comprises of Cancer, Diabetes, Cardiovascular diseases, chronic respiratory diseases, stroke, obesity and injuries. This paves the ways for conducting future research on NCD's and injuries, build on evidence derived from the previous studies, and guide the health professionals and researchers in pursuing their research venture.

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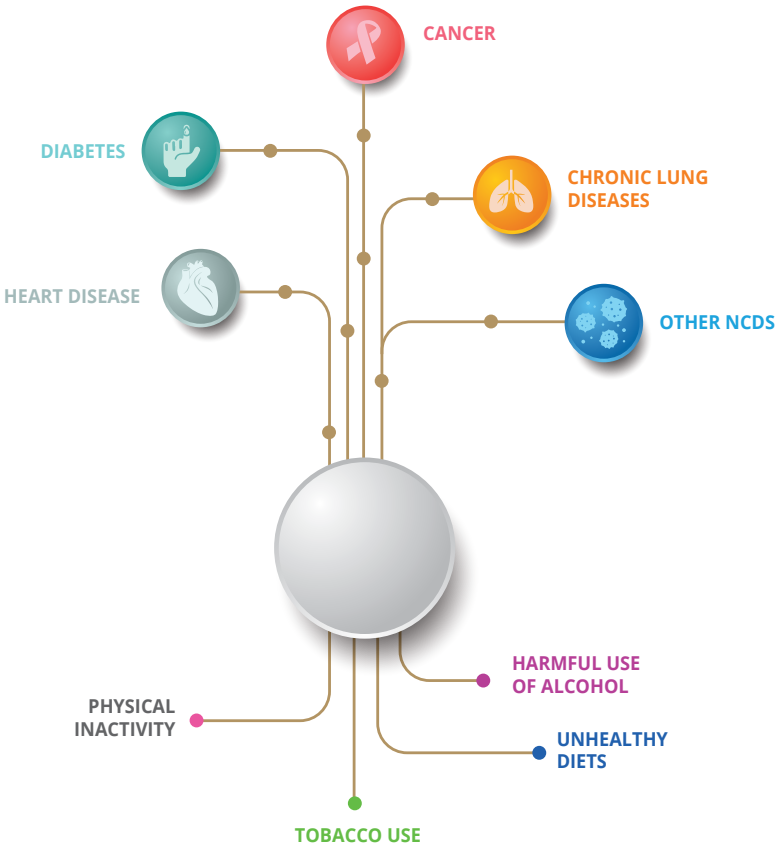

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INTRODUCTION

Non-communicable are categorized as a large and varied group of diseases because they cannot be passed or transmitted from one individual to another [1]. However, the spread of non-communicable diseases (NCDs) presents a global crisis and is considered to be a leading cause of death in almost all countries; wherein women, men, and children are at risk. Globally, considerable gains have been attained in health, economic growth, as well as living standards in the previous years. The major NCD risk factors for individuals are well known in addition to being similar in all countries. The four main "behavioral risk factors for NCDs" among individuals include unhealthy diet, harmful consumption of alcohol, physical inactivity, and tobacco use [2]. Thus, leading to increase in blood pressure, raised cholesterol, glucose levels, and excess body weight. Among the most impactful and primary cause of death from all other non-communicable diseases globally are cardiovascular diseases, cancers, diabetes, and chronic respiratory disease. Evidence based and cost-effective treatment and prevention interventions are being identified. Stricter implementation of tobacco control measures and immediate action on salt reduction are being implemented as effective interventions [3].

United Arab Emirates has taken a national effort to overcome the burden of diseases and injuries. The UAE national agenda 2021 is a turning point for scaling up actions on non-communicable diseases and effective NCD-oriented interventions. The national agenda 2021, includes a set of ambitious targets and indicators that aims on reducing NCD mortality and burden. It seeks to reduce lifestyle related diseases such as cardiovascular diseases, diabetes, and cancer so as to warrant a longer, and healthier life for people. This will result in the UAE becoming among the best countries in the world in terms of quality of healthcare [4].

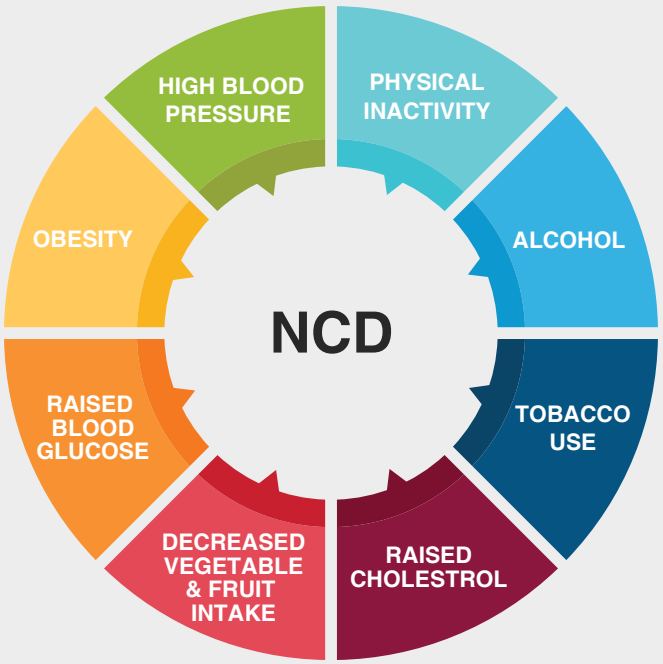
A national agenda established for the health system includes 10 specific goals to be achieved by 2021, five of which are related to NCDs: tackling CVD, cancer, diabetes, obesity and smoking [5]. Recently, NCD multisector action plan 2017-2021 and the establishment of national Committee for NCD prevention and control with full engagements of all non-health sectors was developed. This contemporary development was in response to the implementation of the United Nations Declaration on NCD's in agreement with the WHO's goal of reducing by 25% all NCD-related premature deaths by 2025 [6].

Paramount to the success of these efforts is the emerging support for scientific research [7]. Supporting researches and increasing international collaboration has amplified the contribution of the country to publish researches in high quality journals. As the number of researches conducted in the United Arab Emirates is gradually increasing, therefore the visibility and access to these researches on digital networks will support its utilization on local and global scale. We therefore aim to focus on summarizing the local research studies published from 2007-2016 mainly focusing on the major NCDs (Non- Communicable diseases) such as cardiovascular disease (CVD) (including stroke separately), cancer, chronic respiratory disease, and diabetes together with its shared risk factors. Injuries are also included because these are rapidly emerging as a major cause of death and disability globally. Though NCD's and its risk factors are common for all four diseases, this document addresses the risk factors of each disease separately to facilitate the utilization of studies by specialized health professionals. Summaries of relevant published researches conducted in UAE, indexed in Pub-Med on non-communicable diseases and injuries from the year 2007-2016 were included to help busy clinicians, scientific community, and health care providers to build on evidence derived from studies conducted in the past, to avoid duplication in research activities, inform national strategies/action plans and knowledge translation.

DATA COLLECTION METHOD

The UAE research bank was used as a source for preparing the report. In mid-2016, the statistics and research center developed a research bank (which can be accessed at https://smartapps.moh.gov.ae/ords/f?p=105:521). This is a comprehensive collection of all published papers conducted by UAE institutions on all health-related topics including NCD's and Injuries. The research bank uses PubMed database for extracting health related articles via a combination of keywords and Medical Subject Headings (MeSH). Furthermore, cross reference list were also screened to ensure and extend a thorough literature search.

The database covers information about the author(s), participatory institutions, journals published those papers, full citation, web link, and the abstracts. Our search was restricted to articles in English language, peer-reviewed, disease of interest (such as specific NCD's and Injuries), geographical location (mainly, all emirates of the United Arab Emirates), and year of publication 2007-2016. The search strategy included the use of appropriate keywords (Medical Subject Headings (MeSH) terms) in order to retrieve targeted evidences. The extracted articles were then summarized, and segregated under relevant categories according to themes (such as risk factors, prevalence, diagnosis and management).



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CHAPTER 1

DIABETES MELLITUS

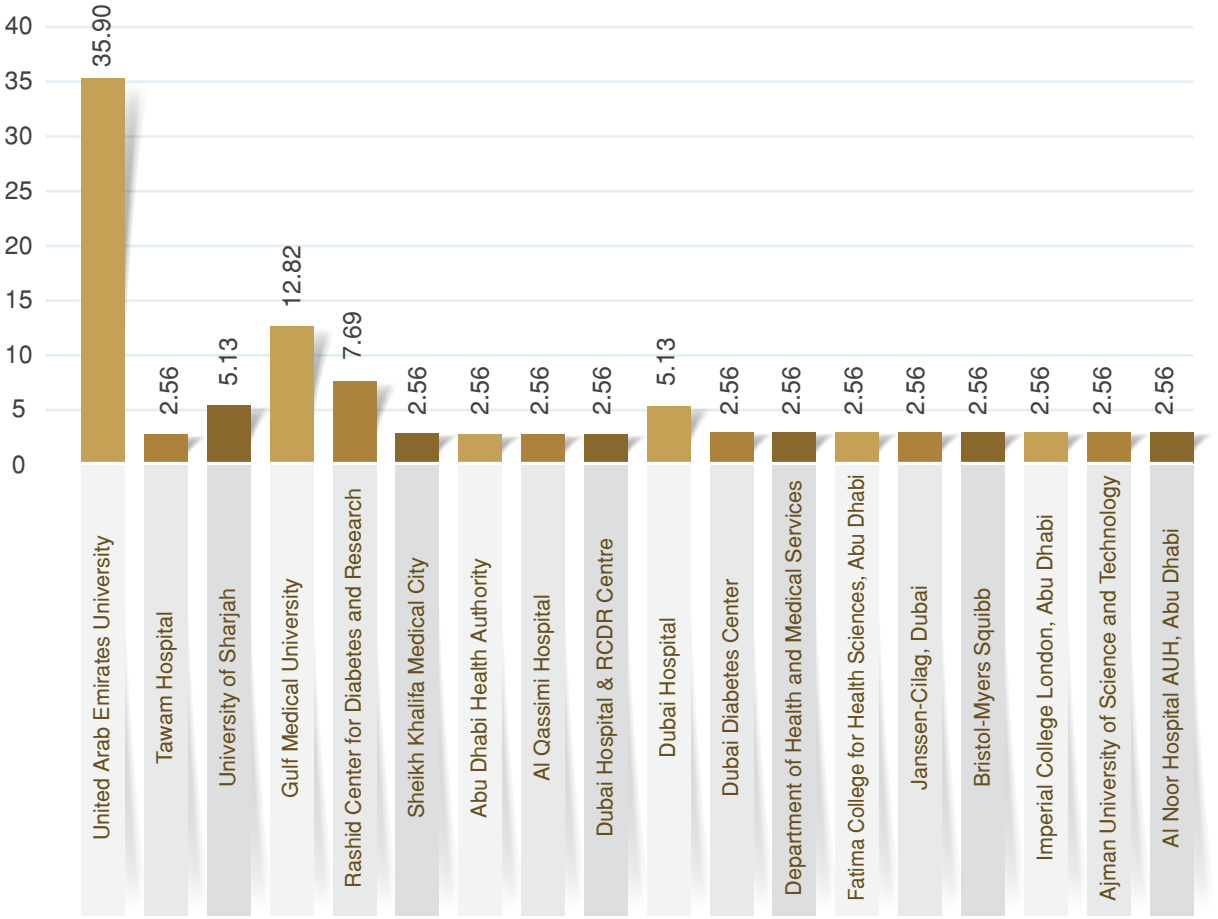
OVERVIEW OF DIABETES MELLITUS

Diabetes Mellitus is a serious chronic disease characterized by elevated blood glucose. It occurs either when the pancreas is incapable to produce sufficient amount of insulin (type 1) or when an individual cannot efficiently use the insulin it produces (type 2). Worldwide, the numbers of diabetics increased to nearly four times from 1980 to 2014 [40]. Moreover, catastrophic medical expenditure are meaningfully higher in individuals with diabetes. The direct cost of diabetes is > US$ 827 billion annually and losses in GDP universally is estimated to be US $1.7 trillion from 2010 to 2030 [41]. In the UAE, diabetes is responsible for 3% of deaths in UAE in 2012 which is equal to the percent of deaths in USA and Germany for the same year [42]. Individuals with diabetes can live long and healthy life when their diabetes is identified early and is well managed. Cost-effective interventions include "multi-sectoral approaches to decrease the prevalence of modifiable diabetes risk factors, a combination of fiscal policies, legislation, changes to the environment, and raising awareness about health risks". Research on diabetes leads to an expansion of knowledge and discoveries. A well-conducted research is important to the success of public health endeavors. A decent research produces outcomes that are examinable by peers, methodologies that can be replicated, and knowledge that can be applied to the real-world circumstances. It is essential that each country puts in place a scientific and consistent research system.

The goal of this chapter is to summarize and document published papers developed by UAE institutions on diabetes during the last decade, identify areas of strengths and map the needs in diabetes research. This chapter provides practical advice for professionals working in diabetes research. It aims to help them understand what research has already been done on diabetes so as to prioritize their research agenda. The chapter is intended to guide the researchers in the UAE and may also be useful for policy-makers and mid-senior public health officers.

STATISTICS RELATED TO PUBLICATIONS

Figure 1: Percent of participation in the published papers on diabetes by institution, 2007-2016



During 2007-2016, the papers on diabetes were published in only 22 journals (Annex 2). Out of these, five journals of highest impact factors were Diabetes Metab Syndr Obes (4.85), Nutrients (4.74), Lancet Diabetes Endocrinol (4.42), PLoS One (3.54) and BMC Public Health (3). During the same period, 110 researchers contributed to diabetes published papers in UAE (Annex 3). The author points are based on the impact factors of the contributed journals and authorship varied from 0.25 to 5.1.

DESCRIPTION OF STUDIES

PREVALENCE OF DIABETES

Only seven studies were conducted to estimate the prevalence of DM, 3 of them were conducted in Al-Ain, 2 in Sharjah, 1 in Abu Dhabi, and 1 in Ajman (Table 1). The prevalence studies were conducted in different states of United Arab Emirates, such as three studies were conducted in Al-Ain [1,5,8], one in Ajman [25], two in Sharjah [21, 23], and one in Abu Dhabi [11]. Of the 7 studies reporting diabetes prevalence, five were cross sectional, one was population based survey, and one retrospective cohort study.

Table 1: Published papers on the prevalence of diabetes in UAE in 2007-2016

No	Study design	Year	Study population	Study Key Findings	Refe rence
1	Cross-sectional survey	2007	Al-Ain district	• 12% suffered from the peripheral vascular disease • 39% suffered from peripheral neuropathy and retinopathy was observed in 19%	[1]
2	Population-based survey of Emirati citizens	2007	Emirati citizens living in Al Ain	• The percentage of participants diagnosed with DM as well as accomplished internationally recognized targets for "HbA1c, LDL-C and blood pressure were 33.3, 30.8 and 42.1%, respectively."	[5]
3	Cross-sectional survey	2004-2005	Al-Ain	• The "annual direct costs" of DM treatment was calculated to be US $1,605. • This cost is 3.2 times greater than the per capita expenditure for health care in the UAE. • This cost raised to about 6.4 times for "patients with macrovascular complications" and 9.4 times for "patients suffering from both micro and macrovascular complications"	[8]
4	A cross sectional survey of adult patients attending two PHC clinics and diabetes center in Shaikh Khalifa Medical City	2011	Abu Dhabi	• 14.6% had undiagnosed T2D, from the total 239 patients at primary healthcare clinics without T2D history.	[11]
5	A cross-sectional survey among Emirati women with diabetes	2014	Sharjah	• Diabetic women (31.4%) were known to have and expressed an episode once in a week or more	[21]

No	Study design	Year	Study population	Study Key Findings	Refe rence
6	A cross sectional study	2015	16 government schools in Sharjah	• The prediabetes and T2D prevalence was "5.4 % and 0.87 %, respectively." • HbA1c demonstrated a substantial discrepancy related to the prediabetes prevalence (21.9 %), excluding diabetes	[23]
7	Retrospective cohort study	2015	Ajman	• The overall incidence in this study was found to be 4.8/1,000 person-years (PY) with predominance of females to be 6.3/1,000 PY in comparison to the incidence among males i.e. 3.3/1,000 PY."	[25]

RISK FACTORS OF DIABETES

Nearly half of the papers were conducted to examine risk factors including hypertension, physical activity, unhealthy diet, use of tobacco (19 out of 39 papers). The highest proportion of studies were done in Al Ain (7 studies) followed by five in Ajman, three in Dubai, two in Sharjah and Abu Dhabi. Out of these 19 studies reporting risk factors, sixteen were cross sectional, two were retrospective cohort studies, and one included randomized controlled trial. These studies are needed to be investigated further and to be considered in the control programmes (Table 2).

Table 2: Published papers on the risk factors of diabetes in UAE in 2007-2016

No	Study design	Year	population	Study Key Findings	Refe rence
1	Cross-sectional survey	2007	Al-Ain	• The PVD and PN risk factors included micro albuminuria (MA), hypertension, type 2 DM, increased diabetes duration, poor education level, and male gender. • Type I DM contributed meaningfully to the retinopathy risk factor. • Retinopathy was higher among individuals with neuropathy, coronary artery disease, peripheral vascular disease, microalbuminuria, and hypertension	[1]
2	Cross-sectional survey	2007	Al-Ain	• Among diabetic population, macrovascular complications were common among males, and is increased with age. • It was also common among patients who were hypertensive with amplified prevalence steadily with DM duration. • Type I Diabetes mellitus was found to be significantly contributing risk factor for retinopathy and it turned out to be higher among patients with "microalbuminuria, peripheral vascular disease, hypertension, coronary artery disease and neuropathy.	[2]

No	Study design	Year	population	Study Key Findings	Refe rence
3	Cross-sectional survey	2012	Al-Ain	• ACS patients suffering from diabetes have different clinical characteristics and also appears to have "poorer outcomes	[14]
4	Cross-sectional study	2015	Abu Dhabi	• At diagnosis, the mean age, systolic blood pressure, waist circumference, BMI, and HbA1c significantly differed between, "Latent Autoimmune Diabetes in Adults (LADA)", "type 2 and type 1 diabetes.	[27]
5	Cross-sectional study	2015	Dubai	• Around 98% of the Type II diabetics have undergone the screening of HbA1c (out of these 28% showed poor control and 50% displayed control), • 55% had blood pressure control; 91% experienced LDL screening (65% had control); • 22% expected attention for nephropathy; as well as 30% had retinopathy screening.	[28]
6	Cross-sectional survey	2009	Al-Ain	• Obese participants were 44% and an additional 34% were known to be overweight. "Abdominal obesity was also found commonly (59%). • 32% experienced an acceptable glycemic control."	[6]
7	Cross-sectional survey	2010	Al-Ain	• Costs was amplified with the duration of diabetes, age, and were greater in patients treated with insulin in comparison to the one given "oral hypoglycemic agents or with diet control only	[8]
8	Cross-sectional survey	2011	Abu Dhabi	• Around 31% were known to have amplified diabetes risk. • 40.1% followed dietary recommendations, 12% conveyed to visit a diabetes educator, 28.2% walked for exercise, and 13.5% achieved recognized targets of "blood pressure, HbA1c, and LDL cholesterol"	[11]
9	Cross-sectional survey	2014	Sharjah	• Duration of diabetes was the most significant risk factor for incontinence	[21]

No	Study design	Year	population	Study Key Findings	Refe rence
10	Cross-sectional survey	2012	Ajman	• 70 % of the university student in Ajman were well aware that DM is often characterized by higher blood sugar levels, and documented family history as a crucial risk factor. • Only limited individuals can be linked with the physical inactivity and obesity as a risk factor to develop diabetes mellitus. • Knowledge of DM complications is found to be high in females than in males. • No significant difference was found in the health behaviors of the respondents either with or without the family history of Diabetes mellitus.	[13]
11	Randomized controlled trial	2014	Al-Ain	• The rates of obesity are underestimated by BMI in comparison to the waist circumference. • Amplified adiposity is related to greater inflammation and decreased antioxidant status and HDL.	[17]
12	Retrospective cohort study	2015	Ajman	• The incidence witnessed was with a female pre-dominance. • With regards to the incidence rates specific to age among males, it may increase with age till 60 years along with demonstrating a declining trend.	[25]
13	Cross-sectional study	2015	Al-Ain	• Literates, female gender, and history of foot ulcer were predictors of practicing foot care.	[30]
14	Cross-sectional study	2016	Dubai	• The diabetic patients for >12 months having glycemic control turned out to be poor correspondingly. • Complications that related with the condition of diabetes for instance cataract (14.1%), cataract (14.1%), background retinopathy (29.9%), and neuropathy (34.9% of patients) were found to be common. • The most common treatment included Oral antidiabetic drug (OAD) monotherapy (43.3%) followed by an insulin monotherapy (17.6%) and insulin + OADs (39.3%).	[38]

No	Study design	Year	population	Study Key Findings	Refe rence
15	Cross-sectional survey	2014	Ajman	• Vitamin D deficiency was observed in 83.2% of theparticipants	[18]
16	Cross-sectional survey	2014	Ajman	• The adherence Self-reported rates to anti-diabetic drugs was calculated to be 84%. Some of the common reasons for non-adherence included forgetfulness while the rate of adherence was same in both genders. • Patients having masters and bachelor degree demonstrated higher rates of adherence to the anti-diabetic medication in comparison to the patients studying in secondary schools.	[20]
17	Cross-sectional survey	2015	Sharjah	• Glycemic status was known to associate significantly with family history of the Type 2 diabetes, parent's employment, first-degree relatives, along with the triglycerides levels.	[23]
18	Retrospective cohort study	2015	Dubai	• In comparison to the diseased groups, the normal coronary group was found to have a "higher high-density lipoprotein cholesterol (HDL-C) levels" and "lower low-density lipoprotein cholesterol (LDL-C)." • The participants mainly patients having normal coronaries were likely to be females, were non-South Asians, non-smokers and had have T2DM for a shorter duration. • These were also known to have reduced LDL levels, higher levels of HDL-C, hemoglobin A1C, and fasting glucose. Besides these variables, environmental and genetic factors are known to protect these patients from atherosclerosis.	[35]
19	Cross-sectional study	2016	Ajman	• The significant hyperglycemia predictors among non-diabetic women were noted to be obesity, and having diabetic husbands after controlling the confounding factors.	[37]

DIAGNOSIS OF DIABETES

Only four studies were conducted on the diagnosis and another four studies on management of diabetes (Table 3 and 4). The highest proportion of studies were conducted in Al Ain (3 studies) [32, 33, 36] followed by one in Dubai [9]. Of the 4 studies reporting diagnosis, two were cross sectional [32, 33], one was two-stage sampling design [36], and one included population based study [9].

Table 3: Published papers on the diagnosis of diabetes in UAE in 2007-2016

No	Study design	Year	Study population	Study Key Findings	Reference
1	Population-based study	2010	Dubai	• Generally DM rate based on HbA was lower than OGTT. • ADA guidelines are sufficient for screening in this high-risk populace.	[9]
2	Screening program	2015	Al-Ain	• The sampling approach for non-UAE nationals when attending the obligatory biannual health check can offer insights for epidemiological research articles in the other Gulf States and UAE, specifically for expatriates	[32]
3	Cross-sectional study	2015	Al-Ain	• 69% of healthcare professionals taking care of pregnant women were cognizant of the pregnancy and Hyperglycemia outcome study • 61% were accustomed with International Association of Diabetes guidelines.	[33]
4	Two-stage sampling design	2016	Al-Ain and Abu-Dhabi	• Diabetics have high level of haptoglobin, adiponectin, and cytoadhesive molecules • Hemoglobin A1c >8.0% is linked with obesity and adiponectin is linked with reduced adiponectin • Obesity is associated with high-sensitivity C-reactive protein (hs-CRP), interleukin-6 (IL-6), tumor necrosis factor-α (TNFα), and higher sICAM-1. • High-density lipoprotein (HDL) <1.02 mmol/L is linked with hsCRP, TNFα, IL-6, and sICAM-1, and lower adiponectin. • Adiponectin negatively correlated with the inflammatory biomarkers in diabetics.	[36]

MANAGEMENT OF DIABETES

The overall diabetes management goal is to support patients suffering from diabetes and their families to gain the essential knowledge resources, life skills, and encourage them to achieve optimal health. The highest proportion of management studies were conducted in Ajman (2 studies) [26, 31] followed by one in Al-Ain [22] and one in Sharjah [7]. Of the 4 studies reporting diabetes management, two were cross sectional [32, 33], one was two-stage sampling design [36], and one included population based study [9].

Table 4: Published papers on the management of diabetes in UAE in 2007-2016

No	Study design	Year	Study population	Study Key Findings	Refe rence
1	Retrospective study	2015	Al-Ain	• Neonatal outcomes analysis of Gestational DM mothers assessed the effectiveness of a multidisciplinary and comprehensive gestational DM program • This showed an inclusive decline in the neonatal complication rates.	[22]
2	Prospective Study	2009	Sharjah	• 25% significant increase in the perception of patients' regarding the competency of the pharmacist to support in limiting the level of blood glucose	[7]
3	Retrospective medical records review	2015	Ajman	• Patients who underwent laparoscopic sleeve gastrectomy and bariatric surgery showed postoperative progress with a typical 68% of excess weight loss observed at 12 months.	[26]
4	Cross-sectional survey	2015	Ajman	• Medical records showed antihypertensive application patterns that were analogous in both age and gender. • Recent trends of prescribing for anti-hypertensive agents among individuals with diabetes is in harmony with JNC-7 recommendations.	[31]

CURRENT SITUATION AND FUTURE CHALLENGES

In light of the increasing diabetes prevalence in UAE [1, 5, 8, 11, 21, 23, 25] and the studies summarized, this report aims to assess the status of diabetes management [22, 7, 26, 31], risk factors [1, 2, 14, 27, 28, 8, 11, 21, 13, 17, 25, 30, 38, 18, 20, 23, 35, 37], and diagnosis of diabetic patients [9, 32, 33, 36]. Risk factors such as physical inactivity, hypertension, poor-quality nutrition, and use of tobacco contributes to the surge in diabetes prevalence specifically type 2 Diabetes mellitus. There is an alarming increase in the number of individuals gaining weight in UAE along with contracting chronic lifestyle diseases for instance, Diabetes. Improving as well as monitoring the general level of diabetes care along with the patient's quality of life in UAE is essential to curb economic problems and long-term health care [1]. The glycemic control is considered to be a major aspect to prevent the complications of chronic diabetes mellitus [6, 8, and 22]. This report can assist to determine the general status of diabetic patients across UAE and can offer valuable insights on the gaps that exists between the actual practices along with clinical recommendations. The findings of the studies mainly emphasized on the need for effective plus regular diabetes education [1] and better control of glycaemia along with prompt management of the associated risk factors and complications [38]. Uncontrolled diabetes can lead to a number of microvascular and macrovascular complications which were addressed in almost 8 studies, majority were from Al Ain [1, 2, 4, 5, 8, 14, 21, 38]. It is these complication that may constitute the disease burden in terms of financial costs and quality of life.

In order to reduce the burden of Diabetes Mellitus, suitable strategies and interventions from government are needed along with the combined efforts from all the stakeholders of the society. The physicians and nurses needs to be targeted for the purpose of facilitating the early detection program and screening implementation, therapeutic diabetes management, self-management counselling, and diabetes prevention consistent with the suitable local guidelines that mainly form the backbone for predicting diabetes epidemic and control [28, 6, 8]. The database also shows 2 studies from Al Ain regarding gestational diabetes which also accounts for impact of diabetes in the society [22, 33]. Hence, early detection and screening of the condition of pre-diabetes (specifically in adult, children, and pregnant females) are needed in order to yield positive outcomes across UAE. Continuing programs of education for general practitioner may offer the clinical inertia that is needed to program adherence and may play a major role in acquiring the targeted levels of glycaemia and disease complications prevention. To manage the disease in future, aggressive clinical measures with regard to early insulin initiation along with optimal doses of oral hypoglycemic agents with suitable modification of lifestyle can have a long term positive effect [38, 8, and 15].

The policies from government may assist in forming guidelines on the management of the diabetes; funding the programs for community-based awareness regarding the availability of diabetic medicines, risk reduction of diabetes along with the diagnostics services and preventive strategies to all the community sections [22]. Efforts by numerous agencies and government across the world to intervene in the management of diabetes have resulted in positive outcomes of health for the members in the community [7, 26]. Nevertheless, despite the rise in diabetes, there lies a paucity of studies to determine the precise disease status due to the ethnic, socioeconomic, and geographical nature of such a diverse and large country as well as its diverse population. As this disease is visible highly across all the segments with UAE, there remains a demand for urgent interventions and researches at national and regional level for mitigating the possible catastrophic boost in diabetes which is being predicted for the coming years.

Within primary care, the future of diabetes looks bright. It is mainly founded on the primary care teams, general practitioners, and health authority commitments so as to develop new strategies to the services related to diabetes based on good evidence. Commitment to own continuing education and training by all the primary care team members are involved in offering diabetes care which is considered to be a single element for success [1]. Formation of the aspects of multidisciplinary working team is important for the provision of continuing as well as update education, with support for people with diabetes in an organized, comprehensive manner in local settings. Innovative diabetes approaches related to management and care might involve community pharmacists and individuals involved in voluntary and local services. Planning the practice services mainly encloses those who receive it, such as caretakers, relatives of diabetic patients and individual suffering from diabetes. There are various examples of innovative strategies for promoting education and health. Due to which it is essential that ideas nationally and locally are being shared and new schemes are being examined as the resources of health are limited. Thus, primary care teams should offer services related to diabetes which should utilize locally agreed district guidelines in forming their own practice programs, that needs to be tailored to their specific practice population. The diabetes registers based on population in all practices will often underpin the care programs that is considered to be a right of every diabetic patient.

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CHAPTER 2
CANCER

OVERVIEW OF CANCER

Cancer is a disease that mainly occurs when changes in a normal cell group within the body leads to uncontrolled growth, mainly causing a lump in certain areas which is referred to as a tumor. It is usually true for all types of cancers except for blood cancer (Leukemia). If the cancer is left untreated, it might spread or grow into the other body parts or normal tissues via the lymphatic system or blood stream, which may impact the circulatory, nervous, digestive or other systems of the body. Lumps or tumors can either be malignant or benign [12].

Benign tumors are not cancerous and therefore rarely threaten life. They grow somewhat gradually, and usually do not spread to other parts of the body. They are made up of cells that are similar to healthy or normal cells. They will only cause a concern when they grow very large, thus, causing discomfort or pressing several other organs for instance, vessels or nerves in addition to brain tumors inside the skull. They may also be troublesome for cosmetic reasons sometimes.

In comparison to the benign tumors, **malignant tumors** grow faster and possess a capability to either destroy or spread within the tissues nearby. The malignant tumor cells can break off from the primary or main tumor as well as can also spread to various other parts of body via a process of metastasis. At a new site, the invasion of healthy tissues continues where the cells grow and divide. These secondary sites are referred to as metastasis and this state is known as metastatic cancer thereby causes complications and ultimately a threat to life if left unattended.

Few of the environmental and lifestyle factors are also known to cause the mutations which tends to cause cancer. Such environmental along with lifestyle aspects are avoidable and controllable to a very large extent in most of the circumstances. For instance;

Physical activity, diet and body weight: The experts of cancer management estimate that maintaining a healthy weight, undergoing regular physical activity and making certain dietary changes can often prevent about 1 in 3 deaths from cancer. Majority of the individuals eat a lot of processed food and red meat. Furthermore, they don't consume enough vegetables and fresh fruits. This type of dietary habits often enhances the risk of cancer [18].

Tobacco: Tobacco smoke mainly comprises of about eighty diverse cancer causing substances including few carcinogenic agents. When smoke is inhaled, the chemicals are known to enter the lungs of an individual, passes into the blood stream and are transported all the way through the body. This is the main reason why chewing tobacco and smoking not only causes mouth and lung cancers, but is also linked with various other cancers. The more an individual smokes, and the longer they continue the habit of smoking especially if initiated in young age, the possibility of developing cancer, along with other risk factors is enhanced [2, 4, 14, 15, and 21].

Ionizing radiation: Radiation sources developed by man can cause cancer and are considered to be a risk specifically for workers. The primary risk is unprotected and prolonged contact to the ultraviolet radiations from sun; which may lead to skin malignancy as well as melanoma. Fair skinned individuals, and people having numerous moles or having a relative who suffered from either non-melanoma or melanoma skin cancer are at a high risk [23, 20].

Infection: A portion of cancer is often caused by an infection from a specific virus. Thus, it does not mean that such type of cancers can be caught like an infection, relatively the virus tends to cause alterations in cells that makes them more probable to turn cancerous, for instance, cervical cancer is associated with Human Papilloma Virus (HPV), lymphomas are associated with Epstein-Barr virus, and primary liver cancer is usually caused by Hepatitis C and B virus [11, 24, 25].

The patient management with cancer is quiet costly. Vast steps in improving the patient prognosis with cancer are almost directly attainable by means of adequate financial resources and present day technology. Therefore, these essentially relate to early detection [12, 14]. Cancer is not known to develop instantaneously, as a substitute it usually evolves slowly and gradually over a period of time with detectable pre-malignant lesions in most of the cases that presage the formation of full blown malignancy. These malignant tumors not only invade the surrounding tissues but are also capable of colonizing others, often vital organs, which is a procedure referred to as metastasis. Metastasic diseases that are spread widely is mainly a harbinger of imminent death of patients. Hence, immediate referral to the oncologist after detecting any symptom or any suspicious lump is dominant; in several parts of world. Patients having poor health present with highly advanced diseases. In an equivalent manner, screening programs for cancer diagnosis are mainly designed to detect not only early "asymptomatic malignant tumors" but also "pre-malignant lesions" [5].

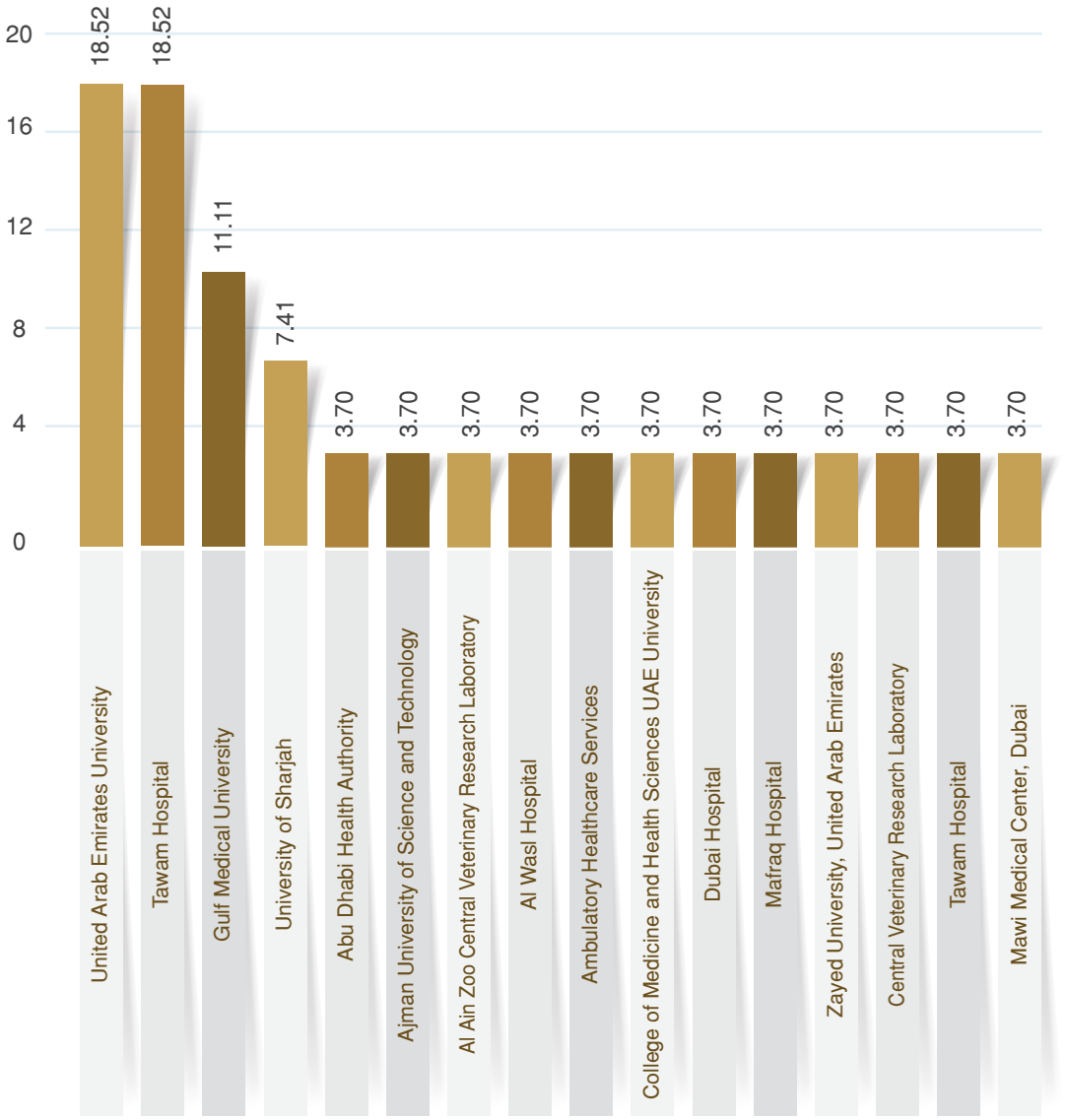
The goal of this chapter is to summarize and address published papers developed by the institutions of UAE on cancer during the last decade, identify areas of strengths,

and map the needs in cancer research. This chapter provides practical advice for professionals working in cancer research. It aims to help them understand what was done on the research and to prioritize their research agenda. The chapter is intended to guide the researchers across UAE and may also be useful for policy-makers and mid-senior public health officers.

STATISTICS RELATED TO PUBLICATIONS

Sixteen institutions in UAE participated in publishing papers on diabetes. Twenty-seven papers were published on cancer during 2007-2016 by UAE institutions (Annex 1). Around, 16 institutions took part in publications in the same period.

Figure 2: Percent of participation in the published papers on Cancer by institution, 2007-2016



During 2007-2016, the papers on cancer were published in 22 journals (Annex 2). The five journals of highest impact factors were cancer (5.64), Annals of the New York Academy of Sciences (5.09), PLoS One (3.54), Asian Pacific journal of cancer prevention (2.39) and Medical Oncology (2.13). During 2007-2016, only 115 researchers contributed to cancer published papers in UAE.

DESCRIPTION OF STUDIES

PREVALENCE OF CANCER

More work is needed to conduct research on the prevalence of cancer. Only 5 studies were conducted to estimate the prevalence of cancer, one of them was conducted in the MOHAP hospital. The prevalence studied were on Epstein-Barr virus in Hodgkin lymphoma, acute leukaemia, gestational trophoblastic neoplasia, appendiceal carcinoids, and non-small-cell lung cancers (Table 5). Of the 5 studies reporting on cancer prevalence, two were cross sectional studies, and three retrospective analysis of case records.

Table 5: Published papers on the prevalence of cancer in UAE in 2007-2016

No	Study design	Year	Study population	Study Key Findings	Refe rence
1	Cross-sectional	2008	Settings: Tawam hospital 88 HL cases in native patients during 1988 through 2004 at	• Among UAE nationals, Nodular sclerosis (NS) subtype are common HL types followed by lymphocyte rich (LR) subtypes, lymphocytic depletion (LD), unclassified, lymphocytic predominant (LP), and mixed cellularity (MC) correspondingly. • Epstein-Barr virus was observed in 17 of 45 (38%) HL cases and was observed predominately in the MC subtype subsequent to LR, LD and NS subtypes correspondingly. • Epstein-Barr virus was expressed more frequently in Hodgkin lymphoma within the pediatric age group population in comparison to adults.	[2]
2	Cross-sectional	2009	Adult diagnosed with AL (January 2000 and December 2006) 34 years median age	• In western countries, acute lymphoblastic leukemia (ALL) was diagnosed more commonly (32%). • There lies a tendency for age-specific rates of incidence and lower crude of ALL, acute myeloid leukemia (AML) and AL in UAE, in comparison to those in western nations.	[3]
3	Retrospective analysis of case records	2011	Al Wasl Hospital, (January 2007 to December 2008)	• 35 gestational trophoblastic neoplasia cases were observed, prevalence being 1 in 400 live births. • Out of these there were 60% local Arabs • Histopathology showed partial mole in 17 cases, complete mole in 13 cases, villi, and hydropic degeneration in 4 cases and 1 case of no identifiable tissue.	[6]
4	Retrospective analysis of case records	2014	Al-Qasmi Hospital (Sharjah) (January 2010 - December 2010)	• Out of the 964 patients recruited, 9 (0.93%) were thought to have appendiceal carcinoids.	[20]

No	Study design	Year	Study population	Study Key Findings	Refe rence
5	A multisite retrospective study	2015	Saudi Arabia institutions, UAE and Qatar	• The histological subtype was adenocarcinoma in 83.4% and squamous cell carcinoma in 9.17%. Overall, EGFRmut were detected in 28.7%, with a prevalence of 32.46% in adenocarcinoma. • No squamous cell carcinomas were found to harbor EGFRmut. • There was no difference between Arabs and non-Arabs.	[21]

RISK FACTORS OF CANCER

Approximately, 59% of papers examined risk factors (16 out of 27 papers) (Table 6). Of the 16 studies reporting on cancer risk factors, nine cross sectional studies, one population-based cross-sectional retrospective survey, four retrospective cohort study, and two qualitative studies. Risk factor studies (n = 16) explored tobacco use, unhealthy diet, family history, infection with HPV, physical activity, and radiation exposure (Table 6). Furthermore, these studies covered different types of cancers including breast cancer studies (n = 6), oral cancer studies (n = 2), lung cancer study (n = 1), Hodgkin Lymphoma (n = 1), three cervical cancer (n = 3), one appendicular carcinoids (n = 1), one acute leukemia (n = 1), and one salivary gland tumors (n = 1).

Table 6: Published papers on the risk factors of cancer in UAE in 2007-2016

No	Study design	Year	Study population	Study Key Findings	Refe rence
Tobacco Use					
1	Cross-sectional	2008	88 HL patient cases (1988 - 2004) Tawam hospital	• In comparison to adult age group, EBV was expressed more commonly in HL with pediatric age group. • The significant relationship between the HL and EBV that have additionally strengthen the proposition that all HL cases needs to be examined for the status of EBV as its existence imposes a significant impact on the response to therapy and prognosis.	[2]

No	Study design	Year	Study population	Study Key Findings	Refe rence
2	Cross-sectional	2010	Nurses who had come to participate in the breast cancer awareness week programme	• In order to begin BSE, 96.1 % of the individuals were responsive of the best age. • 87.7% respondents were aware that female with consistent menstruation need to undertake BSE at a certain day monthly, preferably on 7th and 5th day after menstruation. • Regarding the BSE method, 68.8% were aware that both palpation and inspection are ideal technique for detecting any alteration in an individual's breast. • A huge proportion, 84.4% respondents suggested to perform BSE. 78.3% single and 87.0% married practiced BSE. • Nurse possess a "satisfactory knowledge" about BSE and it is also demonstrated in the BSE practice. • More focus was laid on the BSE in post-graduate and undergraduate courses specifically for nurses as they were intricate more in the education and care of patients.	[4]
3	A multicentre, retrospective study	2013	Four major hospitals in the UAE	• From the 992 reports about the oral biopsy, there were 147 malignant tumor cases that accounted for a total biopsy equivalent to 14.9%. • In total, there were 15 different kinds of malignant lesions diagnosed, of which the OSCC or "oral squamous cell carcinoma" was more prevalent as it was formed from "11.4% of the overall oral biopsies retrieved." • One of the most common cancer presentation included ulceration followed by white lesions and lumps. Additionally common site where lesions were diagnosed included tongue 51.9%), followed by the lips and cheeks. • "Oral squamous cell carcinoma" accounted for about 77 percent of all reported malignancies. The next dissections were performed in only 20.8% of all cases related to OSCC diagnosed at Tawam and Mafraq hospitals, of which 43.75% demonstrated a neck metastasis evidence.	[14]

No	Study design	Year	Study population	Study Key Findings	Refe rence
4	Cross-sectional study	2013	5th year undergraduate dental students	• 83% of the individuals identified the tobacco use as an oral cancer risk factor, 45.6% were aware of the low vegetable and fruits consumptions and 52% identified old age • Around 74.4% of students were capable of correctly identifying the alcohol use as an oral cancer risk factor. • A significant relationship was found between the previous and current tobacco users along with possessing a low knowledge of "risk factors score" (P = 0.015). • However, no significant relationship was found between the study year in the gender, dental college, nationality, and awareness about risk factor scores pertaining to oral cancer.	[15]
5	Cross-sectional study	2014	Female students from three large universities in Ajman, United Arab Emirates (UAE) (April 2011 - June 2012 and included)	• The participants (n = 392) was observed to be more recurrently between 22 and 18 years old (63.5%), never married (89%), and non-Emirati (90.1%). • A breast cancer family history was demonstrated by 36 (9.2%) of the students. • The participant's percentage having below or low average knowledge scores related to the warning signs, risk factors, and techniques for early breast cancer detection was 45.9%, 40.6%, and 86.5%, respectively. • Meaningfully, advanced awareness scores on risk factors were found among respondents having breast cancer history (P = 0.03). • Most likely, the misconception identified included the "treatment for breast cancer affecting female's femininity" (62.5%).	[17]
6	A multisite retrospective study	2015	Institutions from Saudi Arabia, UAE, and Qatar	The multivariate and univariate and analyses demonstrated that non-smoking status, adenocarcinoma subtype, and female gender were significant predictors for EGFRmut. • There was no difference between Arabs and non-Arabs.	[21]

No	Study design	Year	Study population	Study Key Findings	Refe rence
Unhealthy Diet					
7	Cross-sectional	2009	Adult (nationals and non-nationals). (January 2000 and December 2006) Median age 34 years	• 63% were males and 24% were UAE nationals. A statistically significant greater AML incidence was observed among "national females than in national males." • These findings contradicts the generally known results that ALL and AMLO are more frequently found in males. • The accumulative risk factors implications to which a female is exposed for instance, deficiency of Vitamin D because of direct benzene exposure, sunlight deprivation and enhancement of color in henna warrants additional investigation and cannot be excluded.	[3]
Family History					
8	Cross-sectional	2011	Nurses who had come to participate in the breast cancer awareness week programme	• There were 50 % of individuals who agreed strongly with the early breast cancer detection by undertaking self-examination of breast. • About 39% thought that "women aged 40 years and older" have mammogram annually as well as remain to do the same while, 25.3% intensely believed that women in their early 20s and 30s should undergo clinical breast examination as a practice of their "periodic health examination" by health care providers. • 33.8% of the participants agreed intensely believed on offering information on the limitations and benefits of BSE to the female population. • 26% of the respondents were affirmative that women at a high risk should acquire mammogram and magnetic resonance imaging conducted every year.	[5]
9	A qualitative study	2012	Women living in different areas of EAD during April-September 2009	• Few of the difference in opinions, perceptions and beliefs linked with the stated breast cancer cause, preference related to the services of breast cancer, cultural attitudes towards breast cancer, trust in health services, financial considerations were observed across all age groups and nationality.	[8]
10	A cross-sectional survey	2013	Female university students in Ajman	• 22.7% respondents practiced BSE however, only 3% of them practice BSES on a monthly basis. Marital status excluding age is significantly linked with the possibility of age. • For BSE, one of the most frequent barriers included absence of doctor advice, considering oneself not at risk, and lack of knowledge.	[13]

No	Study design	Year	Study population	Study Key Findings	Refe rence
Infection with HPV					
11	A cross-sectional survey	2013	640 women (18-50 years) Al-Ain district in UAE using convenience sampling	• Merely 29% of the women sampled had ever heard of the infection of HPV • Around 15.3% women considered it to be STI. • Only 22% females have also heard of the "HPV vaccine." • In general, three quarter of females perceived that one is capable to prevent cervical cancer. • About 28% were known to recognize vaccine as a preventive step against cervical cancer. Husband's educational level and age (AOR 1.049, 95%CI 1.02-1.08) was significant (p value 0.015) after women's age adjustment.	
12	Qualitative study with interpretivist and social constructivist epistemological approaches	2015	6 South Asian women and 7 Emirati women living in Dubai	• There were four themes related to the female attitudes and beliefs about cervical cancer which emerged from the data. • Initially, the cervical cancer was thought to be a silent disease that can be detected with screening at an earlier age. Nevertheless, it is also linked with extramarital sexual relations that is known to influence negatively the screening uptake. • Secondly, pain and embarrassment, women's fear, as well as cultural influences prevented it from experiencing screening. • Third, an emerging mistrust of impersonal healthcare and allopathic medicine promoted a negative screening views. • Last, female became aware of screening primarily when receiving treatment concerning fertility and when they were pregnant.	
13	A population-based cross-sectional retrospective survey	2015	In the Emirate of Abu Dhabi, UAE (January 2013 to December 2013 Department of Pathology at the SKMC Hospital in Abu Dhabi city	• 4593 females were screened for cervical cancer, possessing 225 (4.89%) abnormal smears. • Most of the abnormal smears included atypical squamous cells with undetermined significance (ASCUS) 114 (2.48%). • Over last 10 years, 60% rise in the abnormal cervical smear number in UAE. The highest incidence of high grade abnormality were observed in females who were above an age of 61 years (1.73%), hence, this women group might have missed the screening change of cervical cancer at an early age and it can be determined by means of a well-known second peak of HPV infection observed in various other prevalence studies.	

No	Study design	Year	Study population	Study Key Findings	Refe rence
Physical Activity					
14	A cross-sectional survey	2014	4 out of 12 religious and cultural community centers in Al Ain city were selected randomly in 2013	• In spite of the increase in the screening modality uptake, limited knowledge of breast cancer screening exist and was considerably evident. Approximately, half of the females (44.8%) never had a CBE or Clinical Breast Exam • 44.1% of women didn't had mammography and expressed limited awareness about the screening technique existence. Around 1/3rd of the respondents interpreted "the presence of a breast lump incorrectly and, moreover, expressed fewer worries about the nature of the lump than would normally be expected.	[18]
Radiation Exposure					
15	A retrospective review of medical records	2015	Pathological data from the Comprehensive Cancer Registry (CCR) for a period of over 25 years from 1998 until 2014	• Among 83 malignant SGT cases observed, peak occurrence was in the fifth decade in life • Frequency: males (61%) > and females (39%) • Tumor type: Muco-epidermoid carcinoma (35%), acinar cell carcinoma (10.8%), and adenoid cystic carcinoma (18.1%). • Similar tumor distribution pattern as found in patients from Middle East, GCC, and Asian countries. • The salivary gland tumors distribution in multiethnic and multicultural population in Gulf was first described. • The development of SGT registry will aid researchers and clinicians to better understand and manage this disease.	[23]
16	Retrospective data collection	2014	Specimens were received at Al-Qasmi Hospital (Sharjah) (January 2010 -December 2010)	• Mean reported age: 28.7 years with "male to female" 2:1 ratio. In total, 8 tumors were found near the tips of appendix having a mean diameter of 3.3 mm, whereas the remaining one near the proximal appendix end. • All these cases were known to be linked with concomitant suppurative appendicitis. In 7 of the cases being reported, the tumors were confined to the muscular layer, whereas in a single case there is an extension of mesoappendix and serosa, respectively. • For neuron-specific enolase on immunohistochemistry, synaptophysin, and chromogranin A, however, it is negative for cytokeratin-7.	[20]

DIAGNOSIS OF CANCER

Cancer is mainly diagnosed by a healthcare professional, who observes tissue and cell samples under a microscope. In some of the instances, investigations are conducted on the DNA, proteins of the cells, and RNA that can assist experts if there's cancer. These test outcomes are very important when selecting the best options for treatment. However, in UAE, additional research is needed in the diagnosis and management of cancer. Only six studies were conducted on the diagnosis and four studies on the management of diabetes (Table 7 and 8). Of the 6 studies reporting diagnosis, one included population-based cross-sectional retrospective survey [25], one was case report [12], two retrospective survey [14, 6], and two included experimental [1, 7].

Table 7: Published papers on the diagnosis of cancer in UAE in 2007-2016

No	Study design	Year	Study population	Study Key Findings	Refe rence
1	Case report	2013	Tawam hospital	• Mr. A. J., a young Afghani male was presented to a local hospital in the UAE and was diagnosed with squamous cell carcinoma invading the posterior cricoid space. • Despite treatment, his disease progressed. • He was referred to the palliative care service cancer center for end-of-life care and symptom management. • Mr. A. J. did not want to return to his home country, Afghanistan because he feared that he would only add to the miseries of his impoverished and already burdened family.	[12]
2	A multicenter, retrospective study.	2013	4 major UAE hospitals	• Of the 992 oral biopsy retrieved reports, 147 malignant tumors cases were found accounting for 14.9% of the total biopsies. • 15 different malignant lesion types were diagnosed, of which oral squamous cell carcinoma (OSCC) was considerably more prevalent, and made up 11.4% of the overall oral biopsies retrieved. • The common cancer presentation included ulceration (31.17%), followed by white lesions and bumps. • The most common site where such lesions were diagnosed included tongue (51.9%), followed by lips and cheeks. • OSCC accounts for 77% of all the reported malignancies. • Dissections of neck were undertaken in only 20.8% of all OSCC diagnosed cases at Tawam and Mafraq healthcare centers, of which 43.75% demonstrated neck metastasis evidence.	[14]

No	Study design	Year	Study population	Study Key Findings	Refe rence
3	Stereotactic Mammotome core biopsies for mammographic calcifications.	2008	32-month period in the Surgery Department at Tawam Hospital, national referral oncology center in the UAE	• Microcalcifications were apparent on the microscopic specimen and radiographs sections in 87% and 96% of cases. • Excisional biopsy is recommended for carcinoma and atypical ductal hyperplasia diagnoses • Patients with benign diagnoses suffered from mammographic follow-up. • 81 lesions ae benign, 6 mixed micropapillary & cribriform, 1 cribriform, 1 comedo, 8 intraductal carcinomas in situ, 4 invasive ductal carcinoma, and 2 invasive lobular carcinoma, 14 carcinomas, and 5 atypical ductal hyperplasias were diagnosed. • Surgical excision in 7 patients diagnosed with intraductal carcinoma in situ demonstrated intraductal carcinoma with limited microinvasion evidence. • Surgical excision in 4 patients with atypia on Mammotome biopsy demonstrated atypical ductal hyperplasia. • Mammotome biopsy proved to be a precise method for early detection, diagnosis and sampling of breast cancer.	[1]
4	Retrospective analysis of case records	2011	Al Wasl Hospital, over a 2-year period between January 2007 to December 2008.	• Before surgical curettage, 34% cases acquired cervical preparation with prostaglandins. • Complication was minor; 25% required single drug chemotherapy, 12% after repeat (second) uterine evacuation, and 62% were cured by primary suction curettage. • 8% cases defaulted after primary evacuation and were lost to follow-up	[6]
5	Gastric mucosal tissues undergoing endoscopy (for upper gastrointestinal symptoms) and gastrectomy (for adenocarcinoma).	2011	Tawam Hospital	• 5% of latter demonstrated intestinal metaplasia evidence. Cancer tissues acquired 3 patient who were examined microscopically in 3 regions, tumor center, tumor edge and safe resected margin. • Progressive alterations in cellular transformation, dysplasia and mucosal thickness is seen and when compared with the changes in biopsies, all appears to represent a progression continuum towards invasive adenocarcinoma. • Multistep process of gastric carcinogenesis was supported in this study and is useful in assessing the expression pattern of molecules and tumor markers that can aid in early gastric cancer detection.	[7]

No	Study design	Year	Study population	Study Key Findings	Refe rence
6	A population-based cross-sectional retrospec-tive survey	2015	In the Emirate of Abu Dhabi, UAE. Department of Pathology at the SKMC Hospital	• In 2013, the total female population number for cervical cancer at SKMC was 4,593, with 225 (4.89%) abnormal smears. • Most of the abnormal smear resulted in atypical squamous cells of undetermined significance (ASCUS) 114 (2.48%). • 60% increase was found in the abnormal cervical smear rates in UAE over last few years. • The highest incidence of high grade abnormality was observed in women above age 61 years (1.73%). This group of women missed the screening chance of cervical cancer earlier in their live and can be explained by means of a well-known second HPV infection peaks as observed in numerous prevalence studies	[25]

MANAGEMENT OF CANCER

Noteworthy advancements have been made in cancer care, therefore, even when cure is not possible, many cancers can usually be managed and controlled for a long time. Various practitioners and physicians consider that the patients are being treated for some cancer type as living with a certain chronic issue. Therefore, patients need ongoing therapy for the purpose of controlling their debilitating condition, such a treatment mainly takes the oral drug forms so that the patients can administer such medication to themselves, similarly like individuals taking high BP diabetes medications. While treating cancers, patients are usually made bound to regular visits to their healthcare professionals for the purpose of receiving injections and chemotherapy intravenously, so as to avoid this, various chemotherapy regimens can be delivered in the form of oral prescription pills. Hence, the patients' needs to take their own responsibility to manage their disease and carefully adhere to a certain plan of treatment and consume the medication prescribed properly. For effectiveness of a certain treatment, compliance with oral drug therapies are of paramount significance.

Of the 4 studies reporting management of cancer, one was cross sectional [9], one was a case study [10], and two included Retrospective studies [16, 19].

Table 8: Published papers on the management of cancer in UAE in 2007-2016

No	Study design	Year	Study population	Study Key Findings	Refe rence
1	Cross-sectional	2012	September -November 2010 using a database of 3000 addresses preserved by the UAE Cancer Congress	• In the final analysis, 564 participants were involved. • 33.3% were from other countries, 11.1% from Asia, 2.0% from UAE, 31.1% from Europe, 7.8% from Canada, and 14.6% were from the United States • Most of the individuals believes progression free survival to be surrogate for an inclusive survival, indicating that cost played a role in the decisions of FDA and such a decision can impact negatively the newer drugs in future which are recently being investigated for MBC. • Most of the participants demonstrated that they will be using "bevacizumab for triple receptor-negative MBC (46.5%)," mainly in the first line setting 44.7%), and in combination with paclitaxel (51.9%).	[9]
2	Case study	2012	Tawam Hospital, Al-Ain	• A case of 12-year-old boy from UAE was reported who relapsed after accomplishment of a surgical resection and was treated successfully with re-resection followed by radiotherapy and chemotherapy. • With 5 years of follow-up, he was asymptomatic and well as well as leading a healthy life. Such a case mainly focus on the poorly prognostic tumors that benefit from post-surgery chemotherapy. • The case also shows an improved UESL patients survival followed by the multimodality therapy with a considerably longer follow up period. • This was the very first case of UESL reported in this region of the world.	[10]
3	Retrospective data analysis	2013	patients of acute lymphoblastic leukemia treated at Tawam Hospital between January 2000 and December 2009	• Inclusively, comprehensive rate of remission was found to be 86.7 % that was considerably inferior for patients with unknown karyotype ($p = 0.004$), CNS leukemia ($p = 0.028$), pregnancy ($p = 0.005$), therapy before June 2002 ($p = 0.02$), and white blood cell count 30-100 $\times 10^9$/l ($p = 0.009$). • With median follow-up of 11.8 months (0.49-126 months), the overall survival estimated (OS) and event-free survival (EFS) at 3 years were 28.7 % and 50.6%, correspondingly. • EFS and OS were inferior significantly for patients not in CR after induction, age >20 years, Ph+, unknown karyotype and therapy before June 2002. • Furthermore, EFS, OS and CR were superior significantly ($p = 0.004$, $p < 0.001$ and $p = 0.001$, respectively) for therapy with our modified UKALL protocol in comparison to the protocol developed by Tawam.	[16]

No	Study design	Year	Study population	Study Key Findings	Refe rence
4	A retrospective analysis of a single-center cohort	2014	a single-center study	• According to the St. Gallen criteria, analysis included 47 node-negative ER+ breast cancer patients with either low or intermediate risk. • The SD mean recurrence score was 3 (6.4%), 19 (40.4%), 25 (53.2%), and 17.7 (8.0) patient with high, intermediate and low recurrence scores, correspondingly. • The recurrence score risk classification were concordant with risk group in accordance with the St. Gallen criteria in 23 patients (48.9%). • Before testing, there were in generally 24 patients (51.1%) who were recommended endocrine therapy alone in addition to 23 patients (48.9%), who were recommended chemo-endocrine therapy. • After testing, 13 patients underwent a change in the treatment and use of chemotherapy decreased in general and specifically in the low Recurrence Score category (from 56.0 to 8.0%; P = 0.0005, McNemar's test). After testing, the patient proportion with chemoendocrine therapy recommendation was significantly different across the Recurrence Score categories. It had an average follow-up of 31.2 months (range: 17-51), with no systemic or locoregional relapses observed.	[19]

CURRENT SITUATION AND FUTURE CHALLENGES

Due to the increasing prevalence of cancers in UAE [2, 3, 6, 20, 21] and the studies summarized, this report aims to assess the status of cancer management [9, 10, 16, 19], risk factors [2, 14, 15, 17, 21, 3, 5, 8, 13, 11, 24, 25, 18, 23, 20], and diagnosis of patients suffering from cancer [12, 14, 1, 6, 7, 25].

Cancer is specifically a complicated diseased state having a cancer distribution that mainly vary geographically with regard to the level of diverse risk factors [2, 14, 15, 17, 18, 23, and 20] and prevalence [2, 3, and 6]. There are many additional etiological agents which are common and essential in lowering the country's income predominantly. Some chronic infections are accompanied by occupational and environmental exposure. In the coming decades, cancer is predicted to be increasingly essential mortality and morbidity cause among all the regions across the globe. The concerns of tackling cancer are huge therefore, when combined with the ageing of population, it enhances the prevalence of cancer that are unavoidable irrespective of the investment levels, future or current actions. The studied prevalence was conducted on non-small-cell lung cancers, appendiceal carcinoids, gestational trophoblastic neoplasia, acute leukemia, and Epstein-Barr virus in Hodgkin lymphoma.

There are various risk factors that boost the likelihood of cancer formation comprising of specific and general factors. Additionally, certain populations are inherently at a huge risk of accepting diagnosis of cancer in their lifetime. Evidence indicates that the rates of cancer continues to increase regionally and globally due to partial access to treatment, unhealthy lifestyles, and suboptimal cancer care quality. Various general strategies can be utilized to limit the cancer risk such as maintaining a healthy body weight, healthy diet which is high in vegetables, fibres and fruits, smoking cessation, limiting alcohol usage, engaging in consistent physical activity,

limiting the risk of infections via preventative strategy, vaccination, reducing exposure to radiation, occupational carcinogens, environmental pollution, and infection control [2, 5, 23].

The exposure and use of tobacco comes in both smoking and smokeless forms. The smokeless tobacco is mainly consumed in un-burnt forms by sniffing and chewing as well as comprises of cancer causing and carcinogenic compounds. Smokeless tobacco is linked with heart diseases, hypertension, and oral cancer along with other conditions [2, 14]. By far smoking tobacco is commonly used form globally that comprises of 4000 chemicals of which 50 are not known to be carcinogenic. With respect to cancer, the dietary constituents and contaminants are a significant concern in few regions. Taking part in 150 minutes of moderate physical activity every week or equivalent is thought to limit the colon and breast cancer by 21 to 25% [28].

The epidemic for global cancer is set to rise continuously which places additional strain on the individuals suffering from cancer, as well as their families. The number of related deaths and cases of cancer across the globe is estimated to be double over the next 20 to 40 years. The rising cancer burden across the globe is often linked to various factors [14, 18] such as:

1. Ageing and expanding population
2. Enhanced modifiable risk factors (physical inactivity, western diet and smoking)
3. High cancer incidence is linked with treatable plus preventable infections (specifically in developing countries)

More than one third of all kinds of cancer are avertible by decreasing risk factor exposure such as sexually transmitted infections, physical inactivity, obesity and tobacco. Preventative measures such as vaccination programs against HPV and HBV plus public education campaigns are essential in future as well as now for the purpose of mitigating the expected increase of individuals who are affected by cancer in the coming years. Early detection often plays its part in limiting the global epidemic of cancer [11, 27]. Screening program implementation to identify the early and pre-cancerous stage are critical in the fight against this health condition in both the developing as well as developed countries. For the purpose of early programs of detection to be effectual, strong system of health care shall be in place so as to offer equity of access to treat and diagnose all the patients of cancer [24]. Additionally, the public education campaigns are required for the purpose of tackling the epidemic of cancer by assisting individuals to identify the early disease signs plus encourage the pursuing of speedy medical attention.

It is vital to strengthen health systems by moving towards universal coverage of health that means to ensure the healthcare services for all individuals at an affordable cost. Without taking urgent action to raise cancer awareness and encourage government to develop multi-sectoral and practical strategies to address the disease, as numerous individuals across the globe will continue to suffer or pre-maturely die every year due to the overwhelming disease. Effectual strategies concerning public health includes home based care and community approaches which are significant to offer palliative and supportive care in addition to pain relief for the families and patients in limited resources.

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CHAPTER 3

CARDIOVASCULAR DISEASES

OVERVIEW OF CARDIOVASCULAR DISEASES

The situation of CVD or Cardiovascular disease is a universal leading cause of mortality and disability across UAE presenting with diabetes, stroke, and renal disease. It mainly includes all the diseases of the circulation and heart. Conventionally, the CVD is considered to be a disease of males nevertheless, more women in comparison to men die due to the cardiovascular diseases [26, 29]. There lies a prodigious interest in the medical science in addition to scientific communities to classify those ways in which the environment relates to the incidence of and risk factors for heart disease. For example, quality of diet may get impacted by the accessibility of healthy versus unhealthy foods in an individual's neighborhood, and an individual's activity levels may be associated with how easy it is for them to incorporate physical activity into their routine lives [23].

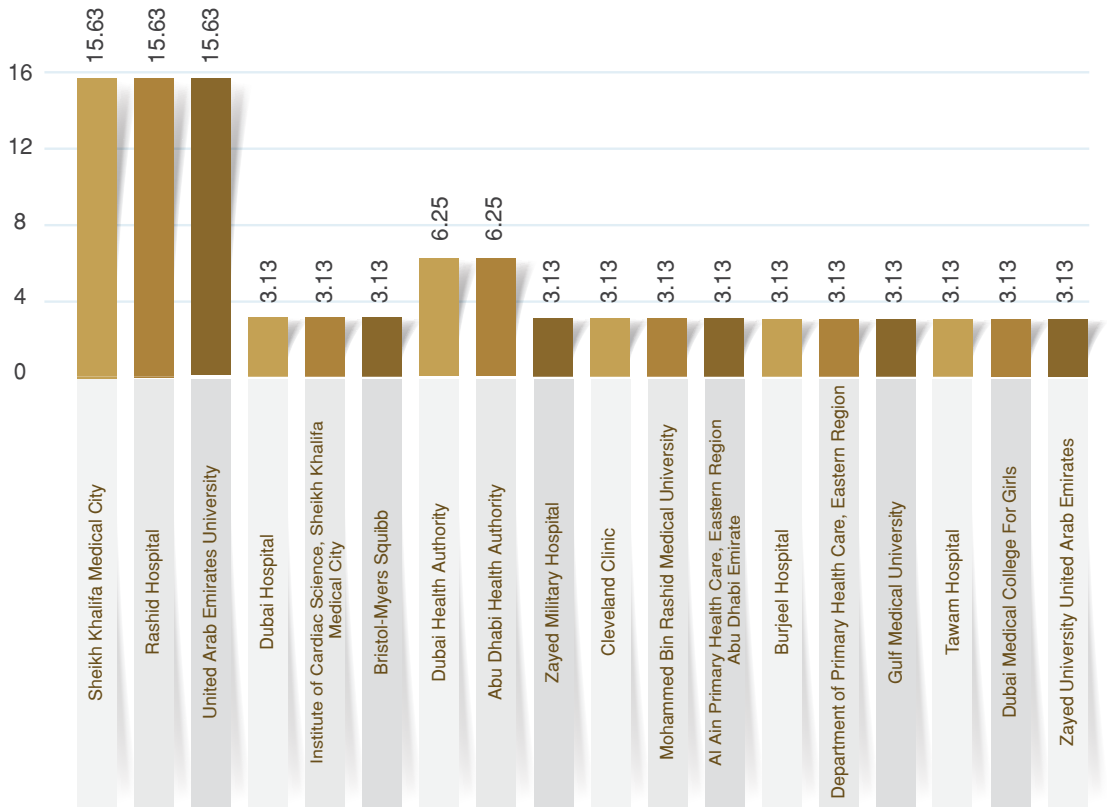
Different guidelines suggests that low exercise levels, raised cholesterol levels, insufficient dietary intake, hypertension, diabetes, high alcohol consumption and smoking impacts, thereby increase the incidence of coronary heart disease [30, 31]. Therefore, the CVD is reflected to be an umbrella term covering coronary heart disease (CHD), peripheral vascular disease (PVD), stroke, and angina. Health care professionals should raise awareness regarding the prevention through health management and health promotion of the CVD. Health care access, precise and prompt diagnosis, and selecting suitable therapy are all key determinants of the consequences in patients with coronary disease [8].

The goal of this chapter is to summarize and address published papers developed by UAE institutions on cardiovascular disease during the last decade, identify areas of strengths and map the needs in cardiovascular disease research. This chapter also provides practical advice for professionals working in cardiovascular disease research. It aims to help them understand what was done on the research and to prioritize their research agenda. The chapter is intended to guide the researchers in the UAE and may also be useful for policy-makers and mid-senior public health officers.

STATISTICS RELATED TO PUBLICATIONS

Eighteen institutions in UAE participated in publishing papers on cardiovascular diseases (Figure 3).Thirty-two papers were published on cardiovascular diseases during 2007-2016 by UAE institutions (Annex 1). Around, 18 institutions took part in the publications in the same period. It is to be noted that none were published by any MOHAP hospital as indicated in Figure 3. During 2007-2016, the published papers on cardiovascular diseases in UAE were published in 28 journals (Annex 2). The five journals of highest impact factors included Eur J Heart Fail (6.526), J Hypertens (6.48), Heart Asia (5.59), Resuscitation (5.41) and BMJ Qual Improv Rep (4.99).

Figure 3: Percent of participation in the published papers on cardiovascular diseases by institution, 2007-2016



DESCRIPTION OF STUDIES

PREVALENCE OF CARDIOVASCULAR DISEASES

More work is needed to conduct research on the prevalence of cardiovascular diseases. Only 6 studies were conducted to estimate the prevalence of cardiovascular (Table 9). One of the prevalence studies was conducted at a national level [9] and another two were multi-center studies [13, 24]. Of the 5 studies describing cardiovascular diseases prevalence all were cross sectional except one literature review [4].

Table 9: Published papers on the prevalence of cardiovascular diseases in UAE in 2007-2016

No	Study design	Year	Study population	Study Key Findings	Refe rence
1	A cross-sectional community based study	2008	Between February 2004 - February 2005 in Al-Ain City, UAE	• 817 participants completed the survey • 28.4% had a Framingham risk assessment score of more coronary heart disease mainly reported in 2.4%.	[29]
2	Literature review	2012	Current status of the management of coronary heart disease in the region, focusing on the role of beta-blockers in particular.	• Lack of contemporary detailed nationally representative epidemiological data in majority of the countries. • Need for national registries development for revealing nature of CHD. Beta Blockers are important to prevent these diseases.	[4]
3	Gulf Registry of Acute Coronary Events (Gulf RACE)	2013	2007 of patients with ACS from 18 UAE hospitals	• Females were considerably older, mainly had cardiac risk factor and were treated significantly less with reperfusion and ß-blockers therapy • Adjusted mortality rates: 1.2% men and 4.6% women • As compared to men, the risk of HF was greater in female (24.6% vs 12.5%; P < .001 • Reasons for higher in-hospital mortality in females shall be investigated additionally	[9]
4	Gulf CARE , a prospective, multicenter, multinational registry	2014	Patients >18 year of age admitted with diagnosis of acute HF (AHF) February 14, 2012 to November 13, 2012. 47 hospitals in 7 Gulf States (Oman, Saudi Arabia, Yemen, Kuwait, United Gulf Emirates, Qatar and Bahrain)	• Sample: 5005 consecutive patients • Majority hospitals included community hospitals (46%; 22/47) followed by non-University teaching (32%; 15/47 and University hospitals (17%). • Majority of them had coronary care or intensive unit facilities (93%; 44/47) with 59% (28/47) having catheterization laboratory facilities. • Considerably, 29% had a dedicated HF clinic facility. Majority of the patients were taken care for by a cardiologist (71%)	[13]

No	Study design	Year	Study population	Study Key Findings	Refe rence
5	Cross-sectional design	2015	Random sample OF mandatory residency visa health screening center in Abu Dhabi	• Overall body mass index prevalence derived obesity and overweight estimates and waist to hip derived central rats of obesity that was 917 (66.7%) and 615 (44.7%) males, respectively. The hypertension was found in 419 (30.5%) of the sample along with the diabetes in 9 (9.0%) of the sub-sample. • Living in the UAE for 6 - 10 years or more than 10 years was associated independently with being classified with central obesity (adjusted odds ratio [AOR] 1.63 95% confidence intervals [CI] 1.13 - 2.35, p < 0.008; AOR 1.95 95% CI 1.26 - 3.01, p < 0.002; respectively) compared to residing in the UAE for 1 -5 years.	[23]
6	A prospective multicenter study (second Gulf Registry of Acute Coronary Events)	2016	From 65 hospitals in 6 Arabian Gulf countries (Bahrain, Saudi Arabia, Qatar, Oman, United Arab Emirates, and Yemen)	• The results suggested that discrimination, goodness of fit, and calibration were excellent • The GRACE risk score post discharge can be utilized for stratifying the one year mortality risk across Arabian Gulf population, it does not need additional calibration as well as has an improved discrimination capability.	[24]

RISK FACTORS OF CARDIOVASCULAR DISEASES

Half of published papers studied risk factors on cardiovascular diseases. While, 50% of papers examined risk factors (16 out of 32 papers) (Table 10). Five of the risk factors studies were multi center studies, one in Dubai, 7 in Al-Ain while three studies conducted in Abu Dhabi. Ten studies reporting on cardiovascular diseases risk factors were cross sectional, 1 study was case-controlled, 2 studies were literature review, and 3 studies were population based.

Table 10: Published papers on the risk factors of cardiovascular diseases in UAE in 2007-2016

No	Study design	Year	Study population	Study Key Findings	Refe rence
Tobacco Use					
1	A cross-sectional community based study	2008	Between February 2004 - February 2005 in Al-Ain City, UAE	• 37.3% obesity, 20.8% hypertension, 23.3% diabetes mellitus, "28.4% had a Framingham risk assessment score" being greater than 20%,19.6% of male smoked, and 22.7% metabolic syndrome. • Abnormal lipid profile was observed in 53.9% females and 64% of the males, mainly because of high triglycerides levels and low high-density lipoproteins.	[29]

No	Study design	Year	Study population	Study Key Findings	Refe rence
2	Health survey stratified by self-reported hypertension	2008	641 normotensive subjects of diverse ethnicity in Al-Ain city	• The results suggest that smoking was similar in two groups (normotensives 14.2, and hypertensives 13.2%). • As compared to normotensives, the prevalence of overweight/obesity, dyslipidemia, and diabetes and thus the 10-year Framingham risk were higher significantly among hypertensives.	[30]
3	A community based survey, of conventional risk factors for cardiovascular disease	2009	817 national residents of Al Ain city, UAE	• Smoking was associated with diabetes. Few metabolic syndrome adjustments reduced, while numerous other remained. • .For example, hypertension and diabetes were still related strongly (OR 2.5; 95% CI 1.7-3.7) after adjustment. • An increased waist circumference showed similar relationship with hypertension (OR 2.3; 95% CI 1.5-3.5). • Diabetes was related to an increased BMI (OR 1.5; 96% CI 1.0-2.3). • Smoking was also associated with diabetes (OR 1.9, 95% CI 1.0-3.3).	[31]
4	Meta-analysis of 6 studies included 1,262 patients with ST-elevation myocardial infarction treated with thrombolytic drugs <6 hours after onset of symptoms and signs of myocardial infarction	2010	6 studies we conducted in the United Arab Emirates from 1995 to 2009	• Young men in UAE; admitted and treated at an early age after acute ST elevation MI onset, recanalization was induced via thrombolysis being a useful therapeutic approach. • Patient's characteristics in the entire study were considerably similar.	[32]
5	A 3-year prospective registry	2010	Four tertiary care hospitals in three major cities of UAE from December 2003 to December 2006	• The mean age was 50.8±10.0 years, and 93.1% were male. • The rate of smoking was found to be 46.4%, and diabetes was present in 38.9%. • In-hospital mortality was found to be 1.68%. While, "in-hospital complications" were not found commonly in the cohort of our registry.	[2]
6	Case controlled study to explore relationships between demographics, socioeconomic status, personality types, stress-handling abilities, emotional intelligence, and cardiac risk factors.	2013	MI patients admitted to a govt hospital in UAE during the period of 2011-2012	• Results suggest a significantly higher Type A personality incidence in the MI group • Additionally, such individuals were also much more likely to suffer from smoking history, hypertension and diabetes in comparison to the control group. • Significant association was found between the presences of CAD and Type a personality. • Association among variables were assessed followed by recommendation, discussion and analysis for treatment and prevention of CAD in UAE.	[7]

No	Study design	Year	Study population	Study Key Findings	Refe rence
7	Multicenter cross-sectional study of asymptomatic peripheral arterial disease among patients with a single previous coronary or cerebrovascular event in the Arabian Gulf	2014	In the United Arab Emirates (UAE), Kuwait and Qatar (64 centers), from October 2008 to December 2010	• Overall, mean cohort age was 54 ± 11 years with (n = 2110) with probably 14% being female (n = 303). • Asymptomatic PAD prevalence was 13.7%, with highest prevalence observed in UAE (14.7%) and Kuwait (16.3%) and lowest in Qatar (5.3%). • Among ethnic groups, significant differences were seen in the prevalence of asymptomatic PAD • It was highest among Caucasian and local Arabs at 19% and lowest among South East Asians (6%). • The most significant predictors of PAD were shown in old age population.	[14]
Hypertension					
8	Prospective multi-national, multicenter registry of patients hospitalized with ACS	2012	The study was selected from the Gulf Registry of Acute Coronary Events (Gulf RACE) in 2007	• 1691 patients were recruited in the study [mean age: 52.6 ± 11.7 years; 1481 Males, 210 Females] with ACS. • HF patients were less frequently males. • 356 (21%) had an admission HF diagnosis (Killip class II/III and IV). • The condition of HF was associated more frequently with diabetes mellitus (DM), hyperlipidemia, and hypertension. • Heart failure was associated significantly with in-hospital mortality • The results from multivariate logistic regression suggested DM, heart rate and hyperlipidemia with higher in hospital HF.	[3]
9	Gulf Registry of Acute Coronary Events (Gulf RACE)	2013	1697 of the Gulf Registry of Acute Coronary Events (Gulf RACE), 2007	• Females were significantly older, more usually had cardiac risk factors and were significantly less treated with reperfusion therapy and ß-blockers. • The adjusted rate of mortality in female was found to be 4.6% versus 1.2% in men (P < .001). • In comparison to men, the HF was higher in females. • Reasons for high mortality in hospital needs to be further investigated.	[9]
10	Gulf CARE, a prospective, multicenter, multinational registry for patients >18 year of age admitted with diagnosis of acute HF (AHF).	2014	February 14, 2012 to November 13, 2012. Forty-seven hospitals in 7 Gulf States (Oman, Saudi Arabia, Yemen, Kuwait, United Gulf Emirates, Qatar and Bahrain)	• 5005 consecutive patients were recruited • Most of the hospitals included community hospitals (46%; 22/47) followed by University hospitals and non-University teaching • Majority of the hospitals had coronary or intensive care (93%; 44/47) facilities with 59% (28/47) having catheterization laboratory facilities. • 29% (14/47) had a dedicated HF clinic facility • Majority of the patients (71%) were cared for by a cardiologist.	[13]

No	Study design	Year	Study population	Study Key Findings	Reference
11	prospective analysis of consecutive patients admitted with decompensated HF	2014	2 government hospitals in the UAE, from 1 December 2011 to 30 November 2012	• Multivariate factors of HF-PEF vs. HF-REF comprises of anemia (OR 2.97; 95% CI 1.64–5.38), Charlson Comorbidity Index score (OR 0.75; 95% CI 0.64–0.88), COPD or asthma (OR 2.80; 95% CI 1.47–5.35), AF (OR 1.82; 95% CI 1.05–3.15), angina or myocardial infarction (OR 0.42; 95% CI 0.25–0.71), age (OR 1.02; 95% CI 1.01–1.04), female sex (OR 2.38; 95% CI 1.41–4.03), heart rate (OR 0.98; 95% CI 0.97–0.99), and elevated systolic blood pressure [odds ratio (OR) 1.02; 95% confidence interval (CI) 1.01–1.03]. • In-hospital outcomes were similar between the two groups. • Nevertheless, patients with HF-PEF were less likely to be prescribed HF medication, and utilized fewer antiplatelet medications and more anticoagulants.	[16]
12	Voluntary point-of-care CVDRF screening was conducted in Follow-up for newly diagnosed diabetes mellitus, hypertension, and dyslipidemia	2015	4 shopping malls, 9 health care facilities, and 3 labor camps in 5 cities in the United Arab Emirates.	• 4,128 subjects were screened [22% at labor camps, 36% at health care facilities, and43% at malls] • Subjects were young relatively (38 ± 11 years), predominantly male (75%), of diverse nationalities (UAE) 7%, and other Asians: 5%, 10%, South Asians, other Arabs: 10%, and other nationalities: 5%. • CVDRF were recurrent (central obesity: 24%, current smokers: 21%, dyslipidemia: 69%, hypertension: 31%, diabetes mellitus: 32%, and obesity: 20%) • Majority of the subjects (85%) had ≥1 CVDRF, and many (17%) had ≥3 CVDRF. • New dyslipidemia, hypertension, and diabetes mellitus diagnosis were uncovered in 61.5%, with the highest yield (74.0%) in labor camps. • With new CVDRF at follow up, positive alterations in lifestyle was reported in 60%, among them only 33% consulted a physician, • Diagnosis was confirmed in 87% for dyslipidemia, 93% for hypertension, and 63% for diabetes mellitus.	[21]
13	A prospective, international, multi-center cohort study of OHCA across the Asia-Pacific	2015	January 2009 to December 2012	• 41,004 cases were presumed cardiac etiology; the mean OHCA age occurred varied from 49.7 - 71.7 years. • Male proportion ranged from 57.9% to 82.7%. • Proportion of unwitnessed arrest ranging from 26.4% - 67.9%. Shockable rhythm rates were demonstrated that ranged from 4.1% to 19.8%. • The rates of CPR varied from 10.5% - 40.9%, however <1.0% of these arrests acquired bystander defibrillation. • Survival with good neurological function ranged from 1.6% - 3%. • Overall survival to hospitals discharged varied from 0.5% - 8.5%.	[22]

No	Study design	Year	Study population	Study Key Findings	Refe rence
Physical Activity					
14	Literature review	2012	Current status of the management of coronary heart disease in the region, focusing on the role of beta-blockers in particular.	• At present, the detailed national representative epidemiological data lacks for various nations, and high proportions of transitory expatriate workers in countries for example UAE and Saudi Arabia tend to complicate the development of such type of data sets. • Improvements in lifestyles (increases the physical activity and reduces the intake of calories) in patients across the region which is important however, environmental and cultural barriers tend to render this issue. • Suitable pharmacologic treatment prescribing is important in the management and prevention of CVD. • Specifically, current controversies relates to the therapeutic profile of beta-blockers that tends to limit its usage. The recent evidence based indicates that beta-blockers are as effective as some other therapies for the purpose of preventing CVD and the issues that related to the utilization of CVD and hypertension that have been overstated.	[4]
15	Population-wide cardiovascular screening program using Self-reported indicators, anthropometric measures, and blood tests to screen 50,138 adults aged 18 years or older	2012	Adults in Abu Dhabi	• The mean age of participants was 36.82 years (SD=14.3); 43% included men. • The prevalence rates of risk factors were as follows: • hypertension, 23.1%; dyslipidemia, 44%; prediabetes, 27%; diabetes, 18%; central obesity, 55%; overweight, 32%; and obesity, 35%. • Furthermore, 26% of men included smokers than women 0.8%. • Age-standardized pre-diabetes and diabetes rates were 30% and 25% respectively, and age-standardized rates of overweight and obesity were 34% and 41%.	[5]
Unhealthy Diet					
16	a cross-sectional design, participants completed an interviewer-led adapted version of the World Health Organization STEPS questionnaire, and anthropometric and blood pressure measurements were collected	2015	Random sampling from Health screening center (Abu Dhabi)	• The body mass index derived obesity and overweight estimates along with the rates of waist-to-hip-derived central obesity to be 917 (66.7%) males and 615 (44.7%) in females. • 419 (30.5%) of the sample- Hypertension 9 (9.0%) of the sub-sample- Diabetes.	

DIAGNOSIS OF CARDIOVASCULAR DISEASES

Research conducted on management of cardiovascular diseases is higher than what is studied on the diagnosis of cardiovascular diseases. Only four studies were conducted on the diagnosis while nine studies on management of cardiovascular diseases (Table 11 and 12). Of the 4 studies reporting diagnosis, one included retrospective study [8], one cross sectional [15], one prospective multicentre study [24] and one experimental [21].

Table 11: Published papers on the diagnosis of cardiovascular diseases in UAE in 2007-2016

No	Study design	Year	Study population	Study Key Findings	Refe rence
1	Retrospective study was conducted. Cases are patients with significant left ventricular hypertrophy (septum > 15 mm) due to underlying hypertension were analysed and compared with 11 cases of idiopathic hypertrophic cardiography (septum >15mm) to assess the two groups with similar baseline echocardiographic features.	2013	Echo cardiography lab of Rashid Hospital, Dubai, [January 2009 - January 2010]	• The pattern of hypertrophy in the hypertensive patients was more concentric (n = 5; 45%), with asymmetrical septal hypertrophy in 4 (36%) cases, specifically the aged population with sigmoid shape septum. • There were evidence of resting mid-cavity gradient because of reduced left ventricular end-systolic diameter in 4 (36%) cases.	[8]
2	Cross sectional study using the Lausanne screenings and the European Society of Cardiology (ESC)	2014	At Al-Ahli club in Dubai, United Arab Emirates	• In total, 174 (76%) athletes had a negative result of screening. 54 athletes underwent additional testing (23%). • 47 athletes showed false positive results for screening (20.4%). • 4 athletes (2%) were restricted from sport and 7 athletes had a positive screening results. • The number of athletes required to screen for detecting one lethal cardiovascular situation included 33 athletes. • For UAE, the Lausanne recommendations are suited well • The number required for screening in order to detect 1 athlete with serious CVD is acceptable at 33.	[15]

No	Study design	Year	Study population	Study Key Findings	Refe rence
3	Voluntary point-of-care CVDRF screening was conducted in Follow-up for newly diagnosed diabetes mellitus, hypertension, and dyslipidemia	2015	4 shopping malls, 9 health care facilities, and 3 labor camps in 5 cities in the United Arab Emirates.	• 4,128 subjects were screened (22% at labor camps, 36% at health care facilities and 43% at malls). • These subjects were young relatively (38 ± 11 years), predominantly male (75%), and of varied nationalities (other Asians: 5%, South Asians: 74%, other Arabs: 10%, United Arab Emirates: 7%, and other nationalities: 5%). • CVDRF were recurrent (central obesity: 24%, current smokers: 21%, dyslipidemia: 69%, hypertension: 31%, diabetes mellitus: 32%, and obesity: 20%) • Majority of the subjects (85%) had ≥1 CVDRF, and many (17%) had ≥3 CVDRF. • New dyslipidemia, hypertension, and diabetes mellitus diagnosis were uncovered in 61.5%, with the highest yield (74.0%) in labor camps. • At follow-up of those with new CVDRF, positive lifestyle alterations were reported in 60%, but only 33% had consulted a doctor; of these, diagnosis was confirmed in 93% for hypertension, 63% for diabetes mellitus, and 87% for dyslipidemia.	[21]
4	Prospective multicentre study (second Gulf Registry of Acute Coronary Events)	2016	65 hospitals in 6 Arabian Gulf countries (Bahrain, Saudi Arabia, Qatar, Oman, United Arab Emirates, and Yemen)	• Generally, the goodness of fit, discrimination and calibration (Hosmer and Lemeshow statistic P value = .826), were good. • The GRACE risk score post discharge can be utilized for stratifying the risk of mortality in the Arabian Gulf population, it does not need additional calibration and has a good capability for discrimination.	[24]

MANAGEMENT OF CARDIOVASCULAR DISEASES

Only nine studies were identified which demonstrated the management of cardiovascular diseases in the UAE. These studies primarily focused on the cardiovascular programs, hypertension/blood pressure control, lifestyle modifications, pharmacological interventions, and screening.

Table 12: Published papers on the management of cardiovascular diseases in UAE in 2007-2016

No	Study design	Year	Study population	Study Key Findings	Refe rence
1	Patients with STEMI randomized to receive intravenous EPO, 30 000 IU, immediately after onset of administration of tenecteplase (TNK) or to treatment with TNK without EPO	2007	Dubai/ Vermont study) in patients with ST elevation myocardial infarction (STEMI)	• EPO along with its congeners, few of them are devoid of erythropoietic effects that protects the tissues against injurious stimuli. • The EPO promise for positively changing the evolution of acute myocardial infarction merits examination. • Congeners of EPO and erythropoietin itself is mainly useful to protect an individual's heart against injury that is induced by ischemia thereby favorably transforming infarct size. • For this hypothesis, rigorous testing is now progressing considerably in a study which encloses patients with acute MI admitted to hospital within 6 hours after the chest pain onset in whom infarct size is assessed based n serial analysis of creatinine kinase concentrations in thrombolysis and plasma which is pharmacologically induced as promptly as possible.	[28]
2	Program evaluation	2010	Abu Dhabi	• Within the initial 2 years, the Abu Dhabi Cardiovascular Program, "Weqaya," has successfully delivered a Framingham Risk Score for almost all adult Emirati. This is complemented by progressive and clear program such as societal and health care approach to the delivery of CVD interventions. • The responses of health care comprises of the utilization of an evidence based and clear standards of client focused service innovation and clinical care such as the utilization of wellness and mobile clinics along with the attention to the experience of patients as well as improve compliance by utilizing a mixture of enforced, enable and encouraged mechanics. • Abu Dhabi societal approach components comprises of top down measures for the purpose of aligning the civil sector responses such as utilization of regulations and policies for instance, urban planning and trading. Some bottom up measures aims to empower the populations, groups and individuals. • The key towards success of this method lies in routine monitoring, central coordination and evaluation to incorporate the utilization of shared and simple metrics. • The strategy of Abu Dhabi has formed a solid platform for scalable interventions, and for learning so as to do with an impact which is monitored at whole population, groups and individual levels.	[1]

No	Study design	Year	Study population	Study Key Findings	Refe rence
				• An exclusive data architecture in Abu Dhabi will permit first cardiovascular risk score to be formed for the region and the integration of modifiable and novel risk factors into the model. The last two years have seen higher progress in Abu Dhabi for CVD, but the coming 5 -10 years promised to unearth large and real scale solutions that build on the genuine Framingham model. • Additionally, the Abu Dhabi model is adaptable and scalable to middle and low income country settings. Global and local data on the risk of CVD are stark and raises a strong challenge for public health; the time for vibrant actions has arrived.	
3	A 3-year prospective registry. 1842 eligible consecutive patients with suspected ACS.	2010	Four tertiary care hospitals in three major cities of UAE from December 2003 to December 2006.	• 93.1% were males and the mean age was 50.8±10.0 years. • More than half had ST elevation myocardial infarction (STEMI); 51% • Diabetes was found in 38.9% and the rates of smoking was 46.6% • Only a minority utilized ambulance services; 17.3%. • For STEMI patients, the median symptom to hospital time127 (IQR 60-256) min, while the median diagnostic ECG to thrombolysis time was 28 (IQR 16-50) min. • In STEMI, reperfusion was in 81.4% [16.6% primary percutaneous coronary intervention; and 64.8% thrombolysis) • During hospitalization, only a patient minority was unable to receive statin therapy, ACE inhibitors, beta-blockers, anticoagulants, and anticoagulants. • The in-hospital complications were not that common in the registry cohort. 1.68% was found to the in-hospital mortality	[2]
4	A qualitative study	2013	January 2013	• Summary of minimum recommended procedural volumes by the US and European societies to achieve competence in the implantation and management of heart rhythm devices http://www.heartviews.org/viewimage.asp?img=HeartViews_2013_14_3_97_125921_t1.jpg	[6]

No	Study design	Year	Study population	Study Key Findings	Refe rence
5	A retrospective chart review was undertaken. AF was identified based on ICD-9 code (427.31), from a sample of patients defined by any history of anticoagulant use	2014	three hospitals in UAE and three in KSA, to identify AF patients diagnosed between January 2005 and June 2010	• Among the AF patients eligible, most were diagnosed with chronic AF (80.9% in UAE, 63.7% in KSA) as opposed to paroxysmal AF. • Between different countries, the treatments prescribed to AF individuals were different • Warfarin monotherapy was used widely in UAE while numerous other aspirin and warfarin based combination therapies were utilized in KSA with no specific dominant regimen. • In KSA, the bisoprolol (12.5%) and Warfarin and aspirin + bisoprolol (10.5%) therapies in combination were the most common regimens. • The healthcare utilization patterns were also varied, with emergency and hospitalization room visits being more common in KSA and outpatient visits more common in UAE.	[11]
6	Observational study among hypertensive visiting OPD followed up for a period of 3 months. Comparisons were drawn between the BP recordings at the time of enrolment in the study and their follow up values 3 months after enrolment.	2014	patients among hypertensive visiting OPD of the Gulf Medical College Hospital, Ajman, UAE, during the period Jan-Dec 2012	• A statistically significant reduction was observed in both diastolic and systolic BP after three months of providing the PUFA therapy. • The BP reducing PUFA effects were more commonly seen in men. A statistically significant reductions in BP • was found in patients with long standing hypertension and non-diabetic patients	[12]
7	Gulf ICD is a prospective, multi-center, multinational, and observational study. All adult patients 18 years or older, receiving a de novo ICD implant and willing to sign a consent form will be eligible	2015	(Saudi Arabia, United Arab Emirates, Kuwait, Oman, Bahrain, and Qatar). December 2013.	• In six countries, 15 centers are known to enroll patients. • 2/3rd of the center tend to have dedicated electrophysiology laboratories while in about all centers ICDs are exclusively implanted by electrophysiologists. • Approximately, 2/3rd quarter of the center reported annual ICD implant volumes of ≤150 devices, and pulse generator replacements constitute <30% of implants in the majority of centers.	[18]

No	Study design	Year	Study population	Study Key Findings	Refe rence
8	Quality improvement interventions implemented to enhance compliance with VTE risk assessment and the outcomes of those interventions	2015	The study period was from April 2014 till August 2015, Sheikh Khalifa Medical City (SKMC) in Abu Dhabi	• VTE risk assessment compliance improved in general medicine from 4%- 98% • Overall, SKMC compliance from 21% - above 90%.	[19]
9	A multidisciplinary team was formed including interventional cardiologists, catheterization laboratory personnel, Emergency department caregivers and quality staff. The project utilized the Lean Six Sigma Methodology which provided a powerful approach to quality improvement.	2015	Sheikh Khalifa Medical City, a tertiary hospital in UAE	• This procedure reduces the variation and waste along with declining the median door-to-balloon time from 75.9 minutes - 60.1 minutes • Within 90 minutes, the percentage of patients who underwent PCI enhanced from 73 to 96%. • Conclusively, implementation of the Lean Six Sigma methodology lead to having processes that are minimally variable, more efficient and leaner. • The current publication failed to offer evidence of better outcomes, and such lessons learned were extrapolated to other primary percutaneous coronary intervention centers in our structure. • This imposed a remarkable impact on patient experience, quality of care, and safety of patients.	[20]

CURRENT SITUATION AND FUTURE CHALLENGES

Due to the increasing prevalence of cardiovascular disease in UAE [29, 4, 9, 13, 23, 24] and the studies summarized, this report aims to assess the status of cardiovascular disease management [28, 1, 2, 6, 11, 12, 18, 19, 20], risk factors [29, 30, 31, 32, 2, 7, 14, 3, 9, 13, 16, 21, 22, 4, 5, 23], and diagnosis of patients suffering from cardiovascular disease [8, 15, 21, 24].

Non-communicable diseases, of which CVDs are the most prevalent, cause the greatest mortality as well as morbidity worldwide [27]. In the United Arab Emirates, there are approximately one in 4 adults who are aged 65 years or older suffer from diabetes. The patients suffering from diabetes are at an increased risk for developing CVD or Cardiovascular diseases along with associated mortality, and morbidity. This type of risk tend to increase with age. The CVD risk that contributes in diabetes comprise of diminished vascular responsiveness, autonomic dysfunction, hypertension, inflammation, insulin resistance, obesity, dyslipidemia, and hyperglycemia. There are numerous interventions that mainly target the risk for dyslipidemia and hypertension that also show the CVD risk in people suffering from diabetes. However, limited studies exists that directly test the intervention effectiveness in elderly population.

Coronary heart disease (CHD) accounts for a high CVD proportion with risk factors such as, being overweight, elevated cholesterol levels, elevated glucose level, diabetes mellitus, cigarette smoking, and hypertension [29, 3, 4, 23]. It is recommended that medications, lifestyle alterations, and other procedures are considered to be the ways of treating cardiovascular diseases. It is considerably acknowledged that coronary heart disease cannot be cured, however, its symptoms can be managed and functions of heart can also be improved. For instance, fitness, exercise, stopping smoking, healthy eating habits are highly acknowledged as a way to improve the cardiovascular symptoms [30, 31, 13, 5, and 23].

Population-based and ecological longitudinal studies undertaken within individual countries and globally have established the role of novel and traditional risk factors and sub-clinical disease measures while predicting the cardiovascular heart diseases. Assessment of risk with long and short term "risk prediction algorithms" can assist to identify people who can take advantage from the interventions concerning risk factors. Novel risk factor evaluation and sub clinical atherosclerosis screening can also assist in identifying people at a higher risk of cardiovascular diseases. CHD prevention primarily focus on managing and identifying the risk factors at both the individual and population levels by means of the secondary, primary and primordial preventions. The epidemiological studies have offered a hypothesis for subsequent clinical trials that have considerably demonstrated the intervention as well as screening strategies that possess a huge effect on the CHD prevention [28, 2].

In Arab regions, rapid urbanization and relatively young population, leads to the high prevalence of stroke and CHD that is expected to enhance in the coming few decades. This in turn raises the CVD morbidity and mortality rates across the region. "Well-designed population-based nationally representative surveys" mainly focuses on the CVD along with its risk factors which are critical in the Arab regions. Additionally, there lies an enhanced need for the awareness of the high CVD prevalence along with its risk factors among public accompanied by education programs on healthier lifestyles and nutrition that includes enhanced levels of physical activity in both women and men. Furthermore, there is also a need for preventative strategies specifically for diabetics to be utilized in the in management strategies specifically in diabetes and obesity that is critical across the region.

Additional epidemiological CHD studies mainly focus on the elucidation of the combination of screening test or imaging that is best to improve the CHD event prediction specifically examining the vulnerable patients who are at a considerable short term risk of an acute event both in the secondary and primary preventions [8, 15]. Furthermore, these studies need to address essential concerns in personalized medicines such as risk prediction tool development that helps to identify the individuals who are most likely to benefit from and respond to the preventative therapies. Concerted global efforts aim at obesity prevention and various other major risk factors that identify people with cardiovascular risk over and above, targets them with coordinating care and evidence based treatments for individuals with pre-existing CVD that are crucial for limiting the CVD and CHD mortality and morbidity.

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CHAPTER 4

CHRONIC RESPIRATORY DISEASES

OVERVIEW OF CHRONIC RESPIRATORY DISEASES

Chronic diseases are referred to as those that are likely to or have been observed in more than 6 months and is not curable but can be controlled. Diverse international agencies have been making efforts and spending funds to control the infectious diseases. The non-communicable disease evidences indicate high global; pandemic and related fatalities. The current NCDs burden results due to the exposure to past and cumulative risk to health, while the upcoming burden will be determined by the exposure of population to certain risk factors. Moreover, genetic susceptibility, gender, and age are non-modifiable, while various other risk factors are modifiable, albeit with some difficulty. The relationship between chronic diseases and risk factors are similar in every region across the globe and are also stronger in low income nations [5].

Chronic respiratory diseases (CRD) is a collection of chronic diseases that is known to affect other lung structures and the airways. It signifies a major public health issue in the developing countries comprising of "Middle East and North Africa (MENA)" countries. Some of the most common chronic respiratory diseases includes allergic rhinitis, pulmonary hypertension, asthma, chronic obstructive pulmonary disease (COPD), sleep apnea syndrome, and occupational lung diseases [11]. Most of the CRD's are treatable and preventable. Many guidelines such as "global initiatives for allergic rhinitis, asthma along with its impact on Asthma are considerably useful to improve CRD management.

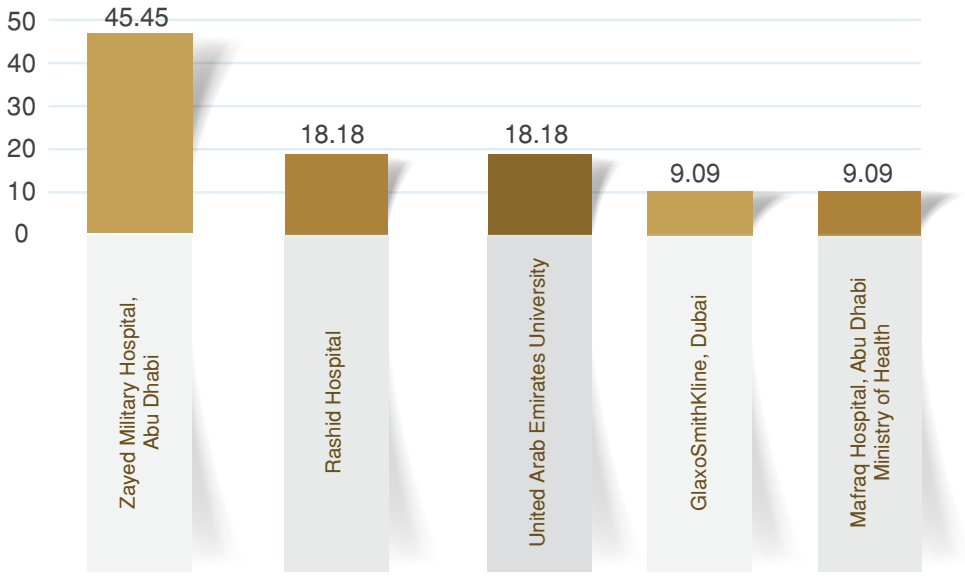
The primary risk factors for chronic respiratory diseases in the United Arab Emirates is represented by outdoor and indoor pollutants, Allergens, and tobacco smoke. This condition is also known to affect individuals with low socioeconomic status. Smoking is thought to be the most prevalent in illiterate individuals. It is considered to be a major risk factor of Chronic Respiratory Diseases. CRD is also a result of environmental factors for example, indoor air pollution from biomass fuel utilized for heating and cooking [2, 5, 6, 10, and 11].

The goal of this chapter is to summarize and address published papers developed by UAE institutions on chronic respiratory diseases during the last decade, identify areas of strengths and map the needs in chronic respiratory disease research. This chapter provides practical advice for professionals working in chronic respiratory diseases research. It aims to help them understand what was done on the research and to prioritize their research agenda. The chapter is intended to guide the researchers in the UAE and may also be useful for policy-makers and mid-senior public health officers.

STATISTICS RELATED TO PUBLICATIONS

Five institutions in UAE participated in publishing papers on chronic respiratory diseases during 2007-2016 (Figure 4).

Figure 4: Percent of participation in chronic respiratory diseases research by institutions in UAE, 2007-2016



During 2007-2016, the published papers on chronic respiratory diseases were published in 9 journals (Annex 2). The five journals of highest impact factors were Respiratory Medicine (3.036), Respiration (2.651), Clinical cardiology (2.431), BMC Pulmonary Medicine (2.329), and Journal of Asthma (1.802)

DESCRIPTION OF STUDIES

PREVALENCE OF CHRONIC RESPIRATORY DISEASES

Of the 7 studies reporting on Chronic Respiratory Diseases prevalence, one was Prospective, multicenter study [5], two-stage, randomly selected survey [4], Cross-sectional survey [6, 8, 11], Observational population-based survey [7], and Retrospective [9].

Table 13: Published papers on the prevalence of chronic respiratory diseases in UAE in 2007-2016

No	Title	Study design	Year	Study population	Study key findings	Refe rence
1	Prevalence and Prognosis of Chronic Obstructive Pulmonary Disease among 8167 Middle Eastern Patients with Acute Coronary Syndrome	Prospective, multicenter, multinational study	2010	8167 consecutive patients hospitalized with ACS from February to June 2007 in 6 Middle Eastern countries.	• The COPD prevalence was found to be 5.3%. • When compared with non-COPD patients, COPD patients were older and more likely to have hypertension, diabetes, and dyslipidemia.	[5]
2	Prevalence and risk factors of asthma among adolescents and their parents in Al-Ain (United Arab Emirates)	a two-stage, randomly selected survey	2010	10,000 questionnaires adolescents and their parents.	• The overall self-reported prevalence of asthma was found to be 13%. • Direct standardization with the population of UAE as the reference yielded a 12% prevalence. • Logistic regression demonstrated family history and UAE nationality (about 50% of nationals were of Bedouin origin) to be the main risk factors for asthma. • A significant (p = 0.001) interaction between age and gender: in the group aged 13-19 years, males had a significantly higher prevalence of asthma [17 and 14%; adjusted odds ratio (OR): 1.45; 95% confidence interval (CI): 1.10-1.90]; in the group aged >19 years, males had a significantly lower asthma prevalence (11 and 13%; adjusted OR: 0.77; 95% CI: 0.60-0.95) than females.	[4]
3	Prevalence of COPD in Abu Dhabi, United Arab Emirates.	A cross-sectional survey	2011	A random sample of individuals 40-80 years old in Abu Dhabi, with a particular interest to explore local risk factors other than cigarette smoking.	• 520 participants were surveyed • 93.7% was considered to be the response rate • 55% male and with a mean age of 52 years, the prevalence of COPD was 3.7% and 95% C.I. (2.0-5.3).	[6]

No	Title	Study design	Year	Study population	Study key findings	Reference
4	Population prevalence of asthma and its determinants based on European Community Respiratory Health Survey in the United Arab Emirates.	Using standard European Community Respiratory Health Survey (ECRHS) questionnaires and tools, this is a cross-sectional assessment	2012	random sample of the population in established quotas of the seven Emirates in the UAE.	• Individual respiratory symptoms prevalence from the ECRHS screening questionnaire in every participants ranged from 8 to 10 % • Individuals 20-44 years presented a reduced prevalence ($p < 0.05$) in all symptoms • The male to female expected ratio reported asthma and wheezing attacks and its treatment by age was not seen. • Woemn taking part reported more individual symptoms than men. • On the whole, there were 15.4% (95% C.I. 13.5 - 17.5) participants who sucessfully fullfilled the criteria of asthma screening • For ECRHS consistency, there were 2.1% pariticpants fulfilling the defination of ECRHS asthma, being 9.8% (95% C.I. 7.8 - 12.2) of those 20-44 years, that is 8.6% of male and 11.8% of female young adults participating.	[8]
5	Chronic obstructive pulmonary disease in the adult population within the Middle East and North Africa region: rationale and design of the BREATHE study	Observational population-based survey	2012	Ten countries in the Middle East and North Africa (Algeria, Egypt, Jordan, Lebanon, Morocco, Saudi Arabia, Syria, Tunisia, Turkey and United Arab Emirates), together with Pakistan	• The overall response rate was found to be 74.2%. • For the “COPD” population, 2,187 (3.5%) subjects fulfilled the criteria. • The evaluable spirometry data were attained from 1,847 (14.2%) subjects to whom it was proposed. • The BREATHE study gathered a huge amount of information on COPD variables from a representative sample of the general population of countries in the MENA areas, that can be compared with other local COPD initiatives.	[7]

No	Title	Study design	Year	Study population	Study key findings	Reference
6	Economic burden of asthma in Abu Dhabi: a retrospective study	Retrospective data collection	2014	Data was compiled for 2011 from health insurance claims covering all medical interventions or treatments coded as asthma. Costs were calculated from a health care perspective	• In total, the direct cost of treatment of 139,092 asthmic patients was foudn to be United Arab Emirates Dirhams (AED) 105 million (US$29 million), corresponding to about AED 750 per patient per annum. • The total cost if generated prinipally by outpatient visits (>AED 85 million; 81% of the total cost). • Ten point four percent of patients had made a visit to the emergency room. • The cost per visit was found to be high during admissions in hospitals (AED 7,123) compared to emergency room and outpatient visits. • The direct asthma medication cost was about AED 33 million (31% of the total cost). • The economic asthma burden in Abu Dhabi is high and the number of emergency visits suggests that the disease is not controlled optimally.	[9]
7	Air Quality and Respiratory Health among Adolescents from the United Arab Emirates.	Cross sectional survey	2015	6,363 adolescents from 9 UAE regions	• Prevalence of Asthma was found to be 12.3%, followed by emphysema (0.5%) and chronic bronchitis (1.8%). • Overall 12.2% reported wheeze and 34.8% reported a dry nocturnal cough in the last few year.	[11]

RISK FACTORS OF CHRONIC RESPIRATORY DISEASES

The two most significant risk factors for "Chronic Respiratory Diseases" included outdoor and indoor air quality, and tobacco smoke (exposure to second-hand smoke and personal smoking). Those who smoke cigarettes increase their risk of developing asthma, Chronic Obstructive Pulmonary Disease (COPD), and lung cancer. Five studies reporting "Chronic Respiratory Diseases" risk factors were Population based survey [2], Prospective, multicenter, & multinational study [5], and 3 cross-sectional survey [6, 10, and 11].

Table 14: Published papers on the risk factors of Chronic Respiratory Diseases in UAE in 2007-2016

No	Title	Study design	Year	Study population	Study key findings	Reference
1	Paternal Asthma is a Predictor for Childhood Asthma in the Consanguineous Families from the United Arab Emirates	Population based survey	2009	Children between 6 and 14 years of age among the local Arab families of the United Arab Emirates	• The childhood asthma prevalence was high among children in consanguineous families (43.3%) compared to non-consanguineous (22.6%, $p < 0.001$). • A significant correlation between the number of asthmatic children/family and degree of consanguinity ($p = 0.0002$). • Girls from a consanguineous families had proportionately more asthma (42.9%, $p < 0.001$) than males (23.1%, $p = 0.539$). • In consanguineous families, paternal asthma enhanced the risk for asthma for both girls and boys ($p = 0.021$ for boys, $p < 0.001$ for girls), whereas, maternal asthma had no significant impact on asthma in offspring. • Most considerable predictors of asthma for girls from consanguineous families were the degree of paternal asthma and consanguinity. • The sole predictors for boys included paternal asthma. • Such interesting observations merits additional studies on both larger sample and in various other consanguineous communities for confirmation.	[2]

No	Title	Study design	Year	Study population	Study key findings	Reference
2	Prevalence and Prognosis of Chronic Obstructive Pulmonary Disease Among 8167 Middle Eastern Patients With Acute Coronary Syndrome	Prospective, multicenter, multinational study	2010	8167 consecutive patients hospitalized with ACS from February to June 2007 in 6 Middle Eastern countries.	• The patients suffering from COPD were less likely to be treated with glycoprotein IIb/IIIa inhibitors, β-blockers (P = 0.001), thrombolytic therapy (P = 0.001), and were more likely to receive angiotensin-converting enzyme (ACE) inhibitors. • Between 2 groups, there was no difference in in-hospital mortality, thus, individuals with COPD were more likely to have HF (P = 0.001). • Despite the fact that COPD patients with ST-segment elevation myocardial infarction were less likely to receive thrombolytic therapy, they suffered more bleeding complications (2.8% vs 1%, P = 0.04), resulting in prolonged hospitalization. • COPD was not an independent predictor of elevated in-hospital mortality.	[5]
3	Prevalence of COPD in Abu Dhabi, United Arab Emirates.	A cross-sectional survey	2011	A random sample of individuals 40-80 years old in Abu Dhabi, with a particular interest to explore local risk factors other than cigarette smoking.	• No difference by gender and prevalence of COPD was only increased significantly in those who were 70 years or older. • Among individuals with COPD, use of cigarette smoking was low relatively (12% former-and 12% current smokers), and it was even lower the use of exposure to passive smoking (5%), pipe (0%), and shisha (5%). • While exposure to biomass was high (33%). • Fascinatingly, bakhour use was very high (78%), but neither bakhour nor any of the above-mentioned exposures were linked with the COPD risk.	[6]

No	Title	Study design	Year	Study population	Study key findings	Reference
4	Case-finding of chronic obstructive pulmonary disease with questionnaire, peak flow measurements and spirometry: a cross-sectional study.	a cross-sectional survey	2014	Sample of individuals 40-80 yrs. old in Dubai invited to answer a short socio-demographic questionnaire then they conducted spirometry to identify airflow limitation compatible with COPD.	• Overall, 525 (91.0%) individuals performed spirometry and PEF (17% UAE Nationals, 68% male, with a mean age of 59 years), 24% reported smoking of different types. • In general, 68 participants (12.9%, 95% C.I. 10.3% to 16.1%) had airflow limitation compatible with COPD. • PEFR alone demonstrated 141 participants with airflow limitation compatible with COPD, with sensitivity of 73.5% and specificity of 80%..	[10]
5	Air Quality and Respiratory Health among Adolescents from the United Arab Emirates.	Cross sectional survey	2015	6,363 adolescents from 9 UAE regions	• Sex is considered to be a significant asthma predictor and dry cough. • Exposure to arts/crafts/ ceramics/stain and tobacco is significant respiratory health predictor • Purposely smelling gasoline fumes/ burning black ants/ car exhaust/ correctors/ glue and tobacco smoking are significant predictors of wheeze and dry cough.	[11]

DIAGNOSIS OF CHRONIC RESPIRATORY DISEASES

At present, decisions related to the treatments in asthma are governed by spirometry and clinical assessment. Sputum eosinophil, which is a marker of airways inflammations, often serves to be a tool to assess the treatment response and severity to treatments in the patients of asthma [1].

Table 15: Published papers on the diagnosis of chronic respiratory diseases in UAE in 2007-2016

No	Title	Study design	Year	Study population	Study key findings	Reference
1	Sputum eosinophil markers in monitoring asthmatic patients in United Arab Emirates	Abstract not available	2008	Abstract not available	Abstract not available	[1]

MANAGEMENT OF CHRONIC RESPIRATORY DISEASES

An effectual management plan for Chronic Respiratory Diseases comprises of four components; manage exacerbations, manage stable COPD, reduce risk factors, monitor and assess diseases. The primary goals for effective management of COPD is to relieve symptoms, prevent the progression of diseases, improve the status of health, exercise tolerance, treat and prevent exacerbations and complication along with reducing the mortality [3].

Table 16: Published papers on the management of chronic respiratory diseases in UAE in 2007-2016

No	Title	Study design	Year	Study population	Study key findings	Reference
1	Asthma insights and reality in the United Arab Emirates	A face-to-face interview and expert interviewers, each respondent self-completed an Asthma Control Test. The sample was stratified by region within the country and sampled proportionately.	2010	200 asthmatics in the UAE	• In the past years, sudden severe asthma attack was reported • The asthmatic percentage that had visits in the emergency rooms within past few years was 27.5%, and 4% were hospitalized. • Only 5.5% utilized corticosteroids in the past years and 47.5% were on short-acting beta-2 agonists. • Only 17% had scheduled follow-up and 66% were followed-up by GP's. • Only 17.8% ever owned a peak flow meter and only 30% ever had a lung function test.	[3]

CURRENT SITUATION AND FUTURE CHALLENGES

Due to the increasing prevalence of Chronic respiratory diseases in UAE [5, 4, 6, 8, 7, 9, 11] and the studies summarized, this report aims to assess the status of Chronic respiratory diseases management [3], risk factors [2, 5, 6, 10, & 11], and diagnosis [1] of patients suffering from Chronic respiratory diseases

The distribution and global prevalence of chronic respiratory diseases is advancing in majority of the populations [5, 4]. Control and prevention are slowly improving and they have not kept pace with the global burden of NCDs [3]. The sustained progress can only occur when influential bodies and governments involved in funding and designing health policies acknowledge that the global public health actions and its scope need to be broadened rapidly to include chronic diseases and its risk factors. These challenges are huge, and the continuing tobacco wars [6] across the world suggest that progress will continue to be slow down unless epidemic responses are scaled up in a manner commensurate with their burden on both societies and families.

The capability to eliminate and control respiratory diseases across the globe mainly relies on the measures of public health, including the increased capacity, education and awareness. Research is important and is known to improve the disease processes which then permits better prevention, treatment and diagnosis [3]. The medical breakthroughs lead to various health improvements, however, these are not always implemented within the community that need them the most. High medical cost are often threatening the financial health of numerous regions. The chronic respiratory diseases are an enormous drain on the resources and often forms a massive health burden globally [8]. A vicious circle, poor health impoverishes countries, and poverty leads to poor health and forms insufficient medications and healthcare access. Health care improvements needs programmatic research, available and well trained workforce, efficient medical system and education for maximizing the research benefits within the context of every nation [9]. Global burden of chronic respiratory diseases has prompted forums to the concerns of respiratory diseases that will aid to educate a broad audience on how vulnerable the lung is. It also informs global policy makers and leaders that respiratory diseases are major cause of childhood illness and have long term negative magnitudes on the health of adults having national economic burden. Healthcare quality is right; essential medication and vaccines should be made available to individuals suffering from the respiratory diseases, exposure to airborne pollutants, and tobacco use needs to be reduced. Improved and better identifications of risk factor triggers, better public awareness, enhanced surveillance of disease burden, and improved health care personnel and physicians trainings, environmental control implementation, better essential drugs access, suitable management, and preventive measure implementation are the major aspects to reduce the disease burden. Country should offer advanced training to the health care professionals with regards to the respiratory diseases. Additional researches are needed to better understand a disease and permit the development of treatments and better diagnostics. Strategy implementation often impose a profound effect on respiratory health, helps to reduce the economic cost, and enhance health equality globally.

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CHAPTER 5
STROKE

OVERVIEW OF STROKE

Stroke is a major cause of disability and death worldwide. Stroke, also known as cerebrovascular disease, is defined as a "rapidly developing clinical signs of focal (or global) disturbance of cerebral function, with symptoms lasting 24 hours or longer or leads to death, with no apparent cause other than of vascular origin". There are two types of stroke based on the underlying pathogenesis [4, 9]: Ischemic Stroke, which is caused by blockage of the cerebral arteries and Hemorrhagic Stroke, which is caused by rupture of the blood vessel inside the brain. Another definition for the stroke or cerebrovascular accident is an onset of acute neurological dysfunction, which results due to cerebral circulation abnormality resulting in the symptoms and signs mainly corresponding to sudden onset of focal neurological deficit.

Risk factors for stroke can be divided into two types: controllable and uncontrollable. The controllable factors can be further categorized into medical risk factors including diabetes, hypertension, hypercholesterolemia, atrial fibrillation, atherosclerosis, circulation problems, and lifestyle risk factors such as cigarette smoking, obesity, alcohol use, and physical inactivity. The uncontrollable risk factors includes age, race, gender, family or preceding history of stroke attack, Transient ischemic attack and Patent Foramen Ovale [3, 4, 5, 6, 7, 8, and 10].

Obesity; is considered to be a major risk for diabetes and coronary heart disease.

Hypertension is a "silent killer" and is the most significant factors causing stroke.

Tobacco use; Cigarette smoking increases the risk of stroke and is one of a significant factor of stroke. It increases the risks of cardiovascular disease, specifically in individuals who started to smoke at young age, and are known to be heavy smokers. Passive smoking is considered to be an additional risk. Tobacco use/smoking contributes to atherosclerosis and causes impairment of vasodilatory function

Abnormal blood lipids; High total cholesterol, low levels of HDL cholesterol, and high LDL-cholesterol and triglyceride levels, are known to enhance the risk of ischemic stroke and coronary heart disease.

Physical inactivity; Increases the risk of stroke and heart disease by 50%.

Diabetes; could lead to microvascular and macrovascular complications and increases lipid deposition and atheroma formation. It increases the risk for renal failure, blindness, limb amputation, cardiovascular disease, and stroke.

Unhealthy diets; Low vegetable and fruit consumption is estimated to cause CHD and stroke universally; intake of high saturated fat intensifies the risk of heart disease plus stroke through its consequences on thrombosis and blood lipids.

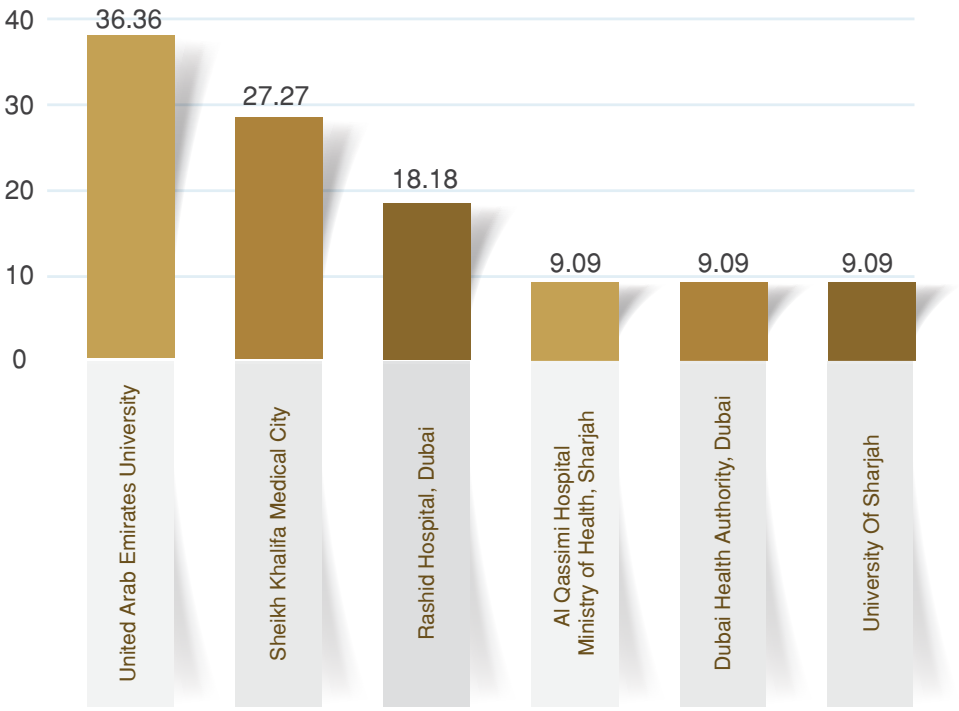
The impairments caused by stroke depend on the site and the size of area affected inside the brain. Most of the stroke survivors live with moderate to severe disability. After a stroke attack, neurological deficits lead to permanent impairments, disabilities, and affect the quality of life of the stroke survivors [1, 9]. The major domains of neurological impairment includes: motor impairments of face and limbs, sensory deficits such as numbness and tingling, vision loss, language disturbance, cognition impairments in memory, calculation and construction, affective disturbance including depression, insomnia, and loss of interests.

The goal of this chapter is to summarize and address published papers developed by UAE institutions on stroke during the last decade, identify areas of strengths and map the needs in stroke research. This chapter provides practical advice for professionals working in stroke research. It aims to help them understand what was done on the research and to prioritize their research agenda. The chapter is intended to guide the researchers in the UAE and may also be useful for policy-makers and mid-senior public health officers.

STATISTICS RELATED TO PUBLICATIONS

Six institutions in UAE participated in publishing papers on stroke during 2007-2016 (Figure 5).

Figure 5: Percent of participation in stroke research by institution in UAE, 2007-2016



During 2007-2016, the published papers on stroke were published in 9 journals (Annex 2). The five journals of highest impact factors were American journal of cardiology (3.154), Clinical Chemistry and Laboratory Medicine (3.017), Nutritional Neuroscience (2.616), BMJ Open (2.562) and Open Cardiovascular Medicine Journal (1.658).

DESCRIPTION OF STUDIES

PREVALENCE OF STROKE

Only a single prevalence study [3] was conducted in seven Middle Eastern countries. This study used a retrospective analysis of prospectively collected data and was examined as per the absence or presence of prior stroke outcomes, management, and demographics. Limited data exists on the prevalence of stroke across UAE (Table 17).

Table 17: Published papers on the prevalence of stroke in UAE in 2007-2016

No	Title	Study design	Year	Study population	Study key findings	Reference
1	Clinical characteristics, precipitating factors, management and outcome of patients with prior stroke hospitalized with heart failure: an observational report from the Middle East.	Retrospective analysis of prospectively collected data	2015	Data from Gulf CARE (Gulf acute heart failure registry), a prospective multicenter study of consecutive patients hospitalized with acute HF in 2012 in seven Middle Eastern countries	The prevalence of prior stroke in patients with HF was 8.1%.	[3]

RISK FACTORS OF STROKE

Risk factor studies (n=7) on stroke explored different risks pertaining to stroke (Table 18). Of the 7 studies reporting risk factors, four were case reports [4, 5, 6, and 7], one was retrospective analysis of prospectively collected data [3], one was meta-analysis [10], and one included case control study [8]. These risk factor studies (n =7) were conducted in different states of United Arab Emirates in different hospitals such as Rashid Hospital Trauma Center, Sheikh Khalifa Medical City, Dubai, Al-Qasimi Hospital, Sharjah [3,4,5,6,7,8,10].

Table 18: Published papers on the risk factors of stroke in UAE in 2007-2016

No	Title	Study design	Year	Study population	Study key findings	Reference
1	Association between homocysteine and endothelial dysfunction markers in stroke disease.	Case control study	2010	40 acute ischaemic stroke patients and 42 hospitalized non-stroke patients	• The findings suggests a rise in the endothelial dysfunction markers subsequent to acute ischaemic stroke, however, no association was found with the concentrations of total plasma homocysteine. • No correlation exists between the vitamins B, endothelial dysfunction markers and total plasma homocysteine in ischaemic stroke patients or controls.	[8]

No	Title	Study design	Year	Study population	Study key findings	Reference
2	Meta-analysis of studies of patients in the United Arab Emirates with ST-elevation myocardial infarction treated with thrombolytic agents.	Meta-analysis	2010	Meta-analysis of 6 studies we conducted in the United Arab Emirates from 1995 to 2009	• In all the studies evaluated in the meta-analysis, the patient characteristics were considerably analogous. • Generally, the mean age was 47 years, where 9% had sustained previous myocardial infarction, 56% were smokers, 20% were hyperlipidemic, 25% were hypertensive, 28% had diabetes, and 98% were men. in comparison to the global experience of recanalization, adverse outcomes incidences of 30-day mortality (3%), major bleeding (0%), stroke (0.4%), and reinfarction (2.5%) was low irrespective of the way it was induced.	[10]
3	Papillary fibroelastoma of the aortic valve--a case report and literature review	Case report	2010	Sheikh Khalifa Medical City Managed by Cleveland Clinic	• The findings from this review indicated that the cardiac papillary fibroelastoma is thought to be rare but is potentially treatable cause of fatal complications and embolic stroke. • While the management of vulvular and cardiac tumors, a possibility of diagnosis should be considered.	[7]
4	Endomyocardial fibrosis causing stroke in a young man	Case report	2012	Rashid Hospital Trauma Center, Dubai	• This study encloses a case study of a man aged 30 years old with eosinophilia of 711/mm and ischaemic stroke. • The ECG demonstrated first degree of heart block with symmetrical T-wave inversions and ST depression in the chest leads. • This patient was examined additionally by cardiac MRI and echocardiography that demonstrate the presence of endomyocardial fibrosis in the heart.	[6]

No	Title	Study design	Year	Study population	Study key findings	Reference
5	Ischaemic stroke as the first presentation of occult squamous cell cancer.	Case report	2013	Al-Qasimi Hospital, Sharjah	• "This study enclosed a case study of 39 years old female who was admitted to the hospital with a sudden onset of left sided weakness, while the CT scan of the brain confirmed an ischaemic stroke. This was a rare presentation of ischaemic stroke of a very rare squamous cell carcinoma of rectum that was not reported in the past."	[4]
6	Blunt traumatic internal carotid artery dissection with delayed stroke in a young skydiver	Case report	2013	Rashid Hospital Trauma Center, Dubai	• A 33 years old sky driver presented to ED after a traumatic landing followed by a parachuting episode. No neurological signs or symptoms at the initial assessment were examined. • This study examined the possible injury mechanism in skydiving that was known to pre-disposed to the cervical dissection occurrence in a patient.	[5]
7	Clinical characteristics, precipitating factors, management and outcome of patients with prior stroke hospitalized with heart failure: an observational report from the Middle East.	Retrospective analysis of prospectively collected data	2015	Data from Gulf CARE (Gulf acute heart failure registry), a prospective multicenter study of consecutive patients hospitalized with acute HF in 2012 in seven Middle Eastern countries	• The Multivariate logistic regression analysis demonstrated that stroke is an independent predictor of 1-year and in-hospital mortality. • In comparison to the cardiologist, the individuals with heart failure were more likely to be admitted under the internists care. • The stroke patients were likely to be older and suffer from left ventricular dysfunction, peripheral arterial disease, chronic kidney disease, ischaemic heart disease, hyperlipidaemia, atrial fibrillation, hypertension, and diabetes mellitus. They were considerably less likely to be smokers.	[3]

DIAGNOSIS OF STROKE

The primary step in examining a patient of stroke is to find whether the patient tends to experience hemorrhagic or ischemic stroke so that an appropriate treatment can be started. An MRI of head or CT scan is considerably the first test being performed.

On the other hand, to help determine the cause, location and type of stoke as well as to rule out other disorders, healthcare professionals can use cerebral angiography, Doppler ultrasound/ Carotid ultrasound, Electrocardiogram, and blood test. Of the 2 studies reporting diagnosis, one included a comparative study [1], while other one was a case control study [9].

Table 19: Published papers on the diagnosis of stroke in UAE in 2007-2016

No	Title	Study design	Year	Study population	Study key findings	Reference
1	Comparison of two imaging protocols for acute stroke: unenhanced cranial CT versus a multimodality cranial CT protocol with perfusion imaging.	comparative study to validate a multimodality cranial computed tomography (CCT) protocol for patients with acute stroke	2007	Two groups: retrospective, historical group 1 with early unenhanced CCT and prospective group 2 undergoing a multimodality CCT protocol. Follow-up unenhanced CCT>48 h served as gold standard in both groups.	• Group 1 demonstrated 12 women, 38 men, clinical onset 2-8 h before modified National Institute of Health Stroke Scale 0-28 and CCT. • Group 2 comprised of 12 women, 38 men, onset 3-8 h before CCT, modified National Institute of Health Stroke Scale 0-28. • Sensitivity was found to be 58.3% in group 1 and 84.2% in group 2. • Computed tomography angiography detected 9 intracranial stenosis/ occlusions. • The higher multimodality CCT protocol sensitivity justifies its usage as a basic diagnostic tool for the set-up of a first-stroke unit in the UAE	[1]
2	Salivary neuron specific enolase: an indicator for neuronal damage in patients with ischemic stroke and stroke-prone patients.	Case control study	2009	Salivary and serum NSE concentrations were measured in 150 individuals. Fifty were patients recently diagnosed as having ischemic stroke	• Serum and salivary concentrations were higher considerably as compared to ealthy controls. • The cut-off threshold for the salivary NSE of 3.7 microg/L was optimum • This demonstrated 80 percent accutacy for ischemic stroke differentiation from normal individuals.	[9]

MANAGEMENT OF STROKE

The main goal for the management of stroke patients is to complete and stabilize initial assessment and evaluation including laboratory and imaging studies, within an hour of the arrival of the patients. Crucial decisions primarily focuses on the need for the determination of benefit/risk, control of blood pressure for thrombolytic intervention, and need for intubation. Only one study was conducted on the management of Stroke [2].

Table 20: Published papers on the management of stroke in UAE in 2007-2016

No	Title	Study design	Year	Study population	Study key findings	Reference
1	A prospective study on the use of warfarin in the United Arab emirates	Cross-sectional survey involved out- and in-patient subjects receiving warfarin.	2012	One-hundred-sixty patients were recruited in Al Ain	• Indications for stroke or dilated cardiomyopathy (12%), prosthetic heart valve (20%), deep vein thrombosis (28%), and atrial fibrillation (35%). • "Warfarin booklets" were considerably made available to 25% of patients, and ~80% of the recipients reporting insufficient understanding of its content. • In 23% of the patients, INR was monitored strictly; ~88% were unaware of warning labels; ~70% never received Information Leaflets; as well as ~58% were unaware that over-the counter medications may affect warfarin. Therapeutic INR (2.9 ± 0.2; 76 days) was achieved in 73%; 20% had high INR (3.7 ± 0.1; 18.6 days) and 7% had low INR (1.6 ± 0.1; 16.7 days). • Co-morbidities and poor compliance were associated with adverse events (p=0.01).	[2]

CURRENT SITUATION AND FUTURE CHALLENGES

Due to the increasing prevalence of Stroke in UAE [3] and the studies summarized, this report aims to assess the status of Stroke, risk factors [8, 10, 7, 6, 4, 5, 3], management [1,9], and diagnosis of patients suffering from Stroke [2].

Stroke is one of the most devastating experiences which affects individuals at a very high rate. Presently, Stroke is one of the most common "neurological disorder", the "second most common global cause of death", and "a foremost disability cause among survivors". The condition of stroke is principally preventable, so that the knowledge of risk factors (that may differ within populations) is important to attain reductions in the rate of stroke in addition to its subsequent burden of disease. An inspection of stroke prevalence, incidence, outcome, subtypes, as well as risk factors in many nations is consequently an essential basis for evidence-based prevention programs [4, 8].

Various diagnostic modalities can be utilized to eliminate conditions with signs and symptoms indicative of stroke. Factors crucial to the process of diagnostics contains clinical presentation, medical history, patient age, the temporal event profile, stroke subtype location, infarct, and explicit etiology. Clinical investigations should be focused on the retinas, heart, as well as peripheral vascular system. Vascular testing for example cerebral angiography or Doppler ultrasonography frequently shed light on the location, nature, in addition to vascular lesions severity in substantial vessels of the neck and head. Cardiac auscultation, electrocardiography and echocardiography can be utilized to reveal valvular or rhythm abnormalities, conduction complications, and a current myocardial infarction (MI) [1, 9].

Stroke Management among patient begins with prevention. Approaches to decrease "stroke-related death and disability" meaningfully influences public health. Several predisposing factors are linked with stroke, and primary prevention emphasizes on the risk factors modification in the general population [2]. Non-modifiable risk factors consist of male gender, advanced age, non-white race, in addition to hereditary predisposition. Stroke incidence intensifies with age. Introducing life-style modifications such as smoking cessation, greater physical activity, healthier diet and reduction of stress are the main necessities for primary stroke prevention. Comorbidity screening for example congestive heart failure (CHF), atrial fibrillation (AF), MI, hypertension (HTN), carotid artery stenosis (CAS), diabetes mellitus, and hypercholesterolemia is considered to be operational primary prevention strategy.

In comparison to the primary prevention of MI, the role of antiplatelet drugs, such as aspirin, in the prevention of a first stroke is controversial. Yet, management of anticoagulation agents and antiplatelet are possible approaches for the cardio embolic stroke deterrence in those with Atrial fibrillation (AF). Prophylactic anticoagulation is also indicated for patients with MI, mechanical heart valves, and CHF who are at risk for thromboembolism. Routine anticoagulation, however, is not warranted for patients with bio prosthetic valves in the absence of earlier thromboembolism."

"Different interventional approaches should be implemented to reduce the risk of stroke among high-risk individuals [10]. There is a constant need to discover innovative therapies to enhance or complement current practice. Several trials of novel therapies needs to be undertaken which can offer great promise for future rehabilitative practice. However, questions remain regarding the long-term safety, cost–benefit, and clinical effect of many of these interventions on functional recovery. With further research their potential usefulness in the real world will emerge over time. These new techniques offer great hope for the future of stroke rehabilitation."

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CHAPTER 6

OBESITY

OVERVIEW OF OBESITY

The term obesity is considered to be a highly pervasive problem that places a person at a huge risk of forming a wide range of adverse concerns related to health. At times, obesity is also referred to as being overweight excessively, which is an unusual body fat accumulation primarily 20 percent or more over a person's ideal body weight [2]. An individual is thought to be overweight if their BMI or body mass index is in between 25 - 29.9, plus an individual is thought to be obese if their BMI is above 30. The issue of Obesity is known to severely interfere with an individual's daily functions and is also linked with enhanced risk of death, disability, and illness. The co-morbidities linked with the conditions of obesity comprises of skeletal disorders, sleep apnea, coronary artery disease, metabolic syndrome, type 2 diabetes, and hypertension [4].

In most of the cases, the condition of obesity is known to be caused by overeating. Such an overeating itself combines both psychological and physical components. People are known to eat spontaneously in order to overcome social maladjustment and fear, avoid intimate associations, and express defiance. Researchers indicates that physical correlates for overeating comprises of deficits in "neurotransmitter serotonin" that is known to enhance the carbohydrate cravings and possibly a "higher body weight set point" that makes obese individuals feel additionally hungry in comparison to individuals who are thin. Such a raised set point is known to result from early nutritional habits and genetics. Limited sedentary living and lack of exercise often contributes towards the condition of Obesity [12].

Both child and adult obesity data indicates that "traditional therapeutic measures" during the management of obesity including behavioral therapy, pharmacotherapy, exercise and diet are proved to be ineffective. Conversely, bariatric surgery is shown to be effectual in the management of obesity. Thus, this type of treatment is expensive while, its invasive nature indicates that it cannot be performed without clinical risk. Therefore, it is noteworthy to suggest that few more efficient measures are needed for the purpose of managing the crisis of obesity.

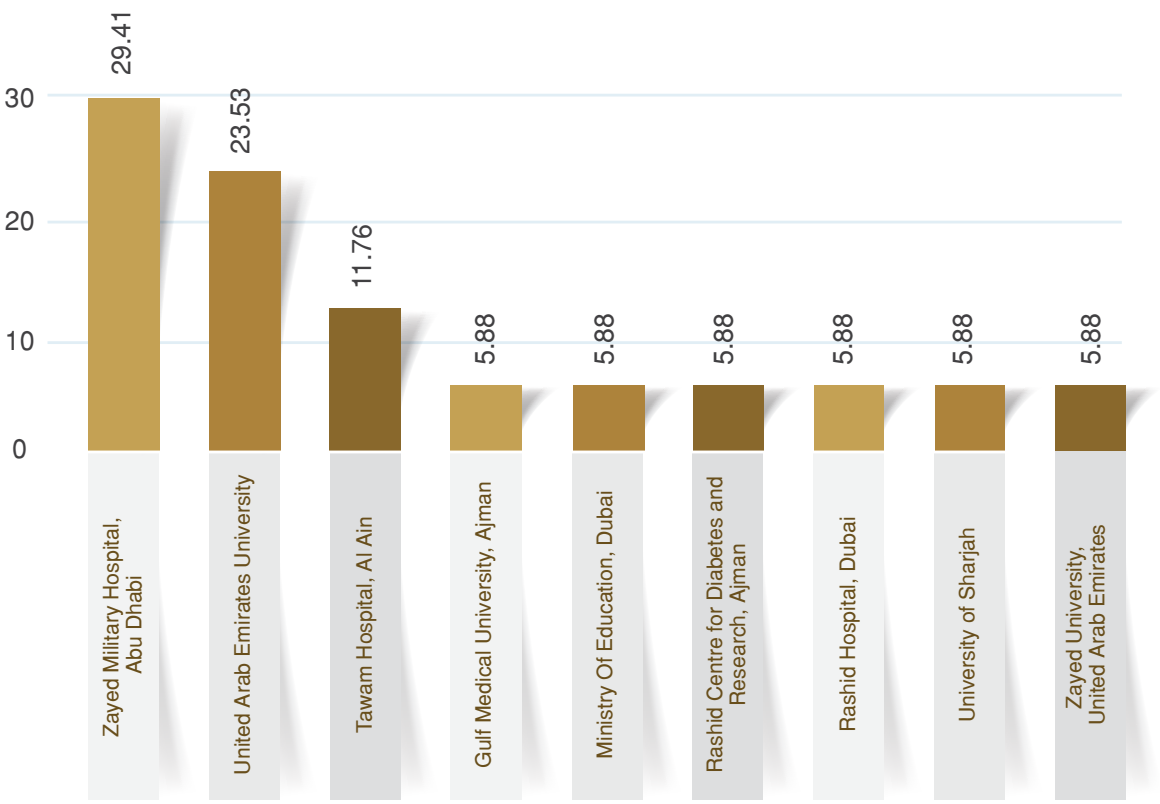
One of the most useful obesity treatment comprises of both the reduction of excessive fat in the body in addition to causative factor elimination and it is accomplished best under medical supervision. A suitable plan for weight loss that comprises of reduced food intake, exercise (that tends to burn calories without decelerating metabolism), psychotherapy , modification of behavior to alter food-related attitudes and if there are foremost psychological causes for overeating. Other possible measures of treatment comprises of appetite-suppressant drugs, hormone therapy, as well as surgical intervention for the purpose of changing the satiety signals by limiting the size of intestines and the stomach [13].

The goal of this chapter is to summarize and address published papers developed by the institutions of UAE on obesity during the last decade, identify areas of strengths and map the needs in obesity research. This chapter provides practical advice for professionals working in obesity research. It aims to help them understand what was done on the research and to prioritize their research agenda. The chapter is intended to guide the researchers across UAE and may also be useful for policy-makers and mid-senior public health officers.

STATISTICS RELATED TO PUBLICATIONS

Nine institutions in UAE participated in publishing papers on obesity. Fourteen papers were published on obesity during 2007-2016 by UAE institutions (Annex 1). Around, 9 institutions took part in the publications in the same period. It is to be noted that none were published by a MOHAP hospital as indicated in Figure 6.

Figure 6: Percent of participation in Obesity research by institution in UAE, 2007-2016



During 2007-2016, the published papers on obesity were published in 14 journals (Annex 2). The five journals of highest impact factors included International Journal of Obesity (5.36), J PLoS One (3.53), Nutricion Hospitalaria (1.25), International Journal of food sciences and nutrition (1.20), and Health and Social Care in the Community (1.15). In half of the journals impact factor was not mentioned.

DESCRIPTION OF STUDIES

PREVALENCE OF OBESITY

Six studies were conducted to study the prevalence of obesity during 2007-2016. Of the 6 studies reporting on obesity prevalence, four were cross sectional studies [2, 5, 9, and 10], one included prospective survey [8], and one population-based study [14].

Table 21: Published papers on the prevalence of obesity in UAE in 2007-2016

No	Title	Study design	Year	Study population	Study key findings	Reference
1	Prevalence of overweight and obesity among adult females in the United Arab Emirates	Cross-sectional survey	2009	724 females, age 20–90 years, were recruited from the seven Emirates. The sample was divided into three age groups, 20 to <30 years, 30 to <60 years and >60 years	• The findings indicate the prevalence of obesity and overweight to be 27% and 16% respectively. • The results suggests a higher proportion of adult females being more obese in UAE than males	[2]

No	Title	Study design	Year	Study population	Study key findings	Reference
2	Obesity among adolescents in five Arab countries; relative to gender and age	Cross-sectional survey	2013	A multistage stratified random sampling technique was used to select the secondary school students from five Arab countries (Kuwait, Libya, Palestine, Syria and United Arab Emirates).	• The Kuwaiti adolescent demonstrated a higher rate of prevalence among obesity and overweight individuals among both females and males in comparison to their counterparts in other countries. • No trends were observed with regards to the proportion of obesity and overweight by age.	[5]
3	Prevalence of symptoms and risk of sleep apnea in Dubai, UAE	Prospective survey	2013	Berlin Questionnaire to a consecutive random sample of patients in the age group older than 14 years, who attended the primary health care center in Dubai Health Authority, Dubai, UAE, from September 2011 to March 2012.	• Prevalence rate: 20.9%; 19.5 % females at a higher risk for OSAS and 2.9% males at higher risk for OSAS.	[8]
4	The prevalence and potential determinants of obesity among school children and adolescents in Abu Dhabi, United Arab Emirates	Cross-sectional population-representative study	2013	1541 students (grades 1-12; aged 6-19 years) were randomly selected from 246 schools (50% male) in Abu Dhabi	• The crude prevalence was 18.9% obesity, 14.7% overweight, and 7.6% underweight. • Obesity was significantly known to be elevated with age (P<0.001). • The majority (61.3%) of students had body mass index (BMI) percentiles above the 50th CDC percentile. • Stepwise linear regression of BMI percentile on dairy consumption, sex, exercise, age, and family income demonstrated a significant (P<0.01) positive association with lack of dairy consumption and age, but not exercise and income. • BP increased significantly with BMI percentile.	[9]
5	Association of Neck Circumference with Obesity in Female College Students	Cross-sectional	2015	Two hundred forty three (243) female students aged 18-25 from Zayed University, Abu Dhabi,	• The prevalence of overweight and obesity together was found to be 28.4 % (n = 69).	[10]

No	Title	Study design	Year	Study population	Study key findings	Reference
6	Increasing obesity rates in school children in United Arab Emirates.	population-based study	2016	44,942 students attending governmental schools in Ras Al-Khaimah	• BMI CDC interpretation was used (11-14 years); "BMI ≥95th percentile 24.3%; BMI ≥99th percentile 5.7%"; BMI prevalence ≥85th percentile with 41.2%. • Obesity increases in a linear fashion from 3 to 12 y (R2 ≥ 0.979). • Every year, 0.28% became extremely obese and 2.36% of the students became obese.	[14]

RISK FACTORS OF OBESITY

In total, 64% of published papers studied risk factors on obesity. One of the risk factors studies was multi-center study conducted in two emirates [1]. Four studies in Abu Dhabi [6, 7, 9, and 10], 1 study in Dubai [8], 2 in Al Ain [3, 9] and another study in Ajman [4]. Of the 9 studies reporting on obesity prevalence, 6 were cross sectional studies, one retrospective study and two qualitative studies (Table 22).

Table 22: Published papers on the risk factors of obesity in UAE in 2007-2016

No	Title	Study design	Year	Study population	Study key findings	Reference
1	Barriers to weight management among Emirati women: a qualitative investigation of health professionals' perspectives	Qualitative study	2008	In-depth individual interviews with a purposive sample of 29 primary health care physicians, dietitians, and nurses in Al Ain and Abu Dhabi medical districts	• Various health care system-related physical barriers, social, as well as personals to weight management were found. • The suggestions of the participants with regards to facilitating the management of weight among Local females comprised of provision of the essential resources, support policies related to lifestyle alterations, and health awareness programs. • Culturally-acceptable programs and peer supports were recommended that offered and holistic strategy to manage and prevent obesity.	[1]

No	Title	Study design	Year	Study population	Study key findings	Reference
2	Barriers and facilitators of weight management: perspectives of Arab women at risk for type 2 diabetes	Qualitative study	2010	A total of 75 Emirati national women (age, 20-60 years) considered high risk for type 2 diabetes participated in eight focus groups. Purposive sampling was used to recruit women from primary healthcare centers (PHCs) in Al Ain, UAE	• Sociocultural norms, limited culturally-sensitive exercise facilities, competing demands, limited social support, low motivation, restricts outdoor physical activities that are considered to be the primary barriers cited by respondents. • Social support for instance, inviting other females to walk with assist in staying physically active. • Provided useful information in forming a culturally congruent healthy weight female promotion programs at risk to suffer from type 2 diabetes. • This has implications for the intervention programs for obesity for females in numerous other Arabian Gulf Countries.	[3]
3	The Use of Obesity Indicators for the Prediction of Hypertension Risk among Youth in the United Arab Emirates	Cross-sectional study	2011	A 110 first year students in a Medical University in Ajman, UAE, during the year 2009-2010	• The primary values for hip circumference, WC, BMI as well as WHR were higher significantly in the hypertensive and pre hypertensive group in comparison to the group with normal BP. • The risk of post and pre-hypertension was significantly enhanced by "4.3 times for participants" having abdominal obesity (identified from high WC) or general obesity (BMI≥ 30)	[4]
4	Obesity hypoventilation syndrome in obstructive sleep apnea patients in the United Arab Emirates: a retrospective cross-sectional study	Retrospective study	2013	Respiratory Care Unit and Sleep Disorder Centre of the Zayed Military Hospital United Arab Emirates	• The findings from this study suggest that women affected more than men (31.8% [7/22] vs. 12.9% [11/85], respectively; p = 0.03); and tends to be older than men, mean age of "of 55 ± 10.6 years versus 46 ± 13 for men." • After gender adjustment, OHS is associated significantly with pulmonary hypertension (OR = 16.1; p = 0.001), ischemic heart disease (OR = 5.1; p = 0.04), diabetes mellitus (OR = 4.6; p = 0.02), and hypertension (OR = 3.5; p = 0.03).	[6]

No	Title	Study design	Year	Study population	Study key findings	Reference
5	Parental weight perceptions: a cause for concern in the prevention and management of childhood obesity in the United Arab Emirates	Cross-sectional survey	2013	1541 students (grade 1-12; 50% boys) and their parents, but only 1440 (6-19 years) and their parents consented Zayed Military Hospital, Abu Dhabi	• The misclassification was highest among parents of obese/ overweight children (63.5%) and underweight (55.1%) children. From all the parent perceptions, 33.8% misclassified their children's' weight status; underestimating (27.4%) or overestimating (6.3%). • Most significantly, perceptions of parents about their children being obese or overweight among truly obese or overweight children, were linked with true child's BMI percentile excluding child's sex, household income, parental education, and age."	[7]
6	Prevalence of symptoms and risk of sleep apnea in Dubai, UAE	Prospective survey	2013	Berlin Questionnaire to a consecutive random sample of patients in the age group older than 14 years, who attended the primary health care center in Dubai Health Authority, Dubai, UAE, from September 2011 to March 2012.	• Higher OSAS female respondents risk: 39.95 years general mean age "((standard deviation [SD] 11.73 years) and was 41.18 years (SD 14.95 years) for male respondents. • In both genders, highest prevalence was observed between ages 51 to 60. BMI: ≥ 30 kg/m(2) in 70% of the high risk groups and nearly 75% of the low risk group had BMI < 30 kg/m(2), for males: mean BMI was 32.06 kg/m(2) (SD 5.67 kg/m(2)) and for females: 33.59 kg/m(2) (SD 6.44 kg/m(2))."	[8]
7	The prevalence and potential determinants of obesity among school children and adolescents in Abu Dhabi, United Arab Emirates	Cross-sectional population-representative study	2013	1541 students (grades 1-12; aged 6-19 years) were randomly selected from 246 schools (50% male) in Abu Dhabi	• Significantly obesity was known to be increased with age while most of the students had BMI or body mass index percentiles above the 50th CDC percentile. • Linear regression stepwise of BMI percentile on exercise, family income, sex, dairy consumption, and age showed a significantly positive association (P<0.01) with limited age and dairy consumption but no exercise or income. • The BP was suggestively known to raise with the percentile of BMI.	[9]

No	Title	Study design	Year	Study population	Study key findings	Reference
8	Association of Neck Circumference with Obesity in Female College Students	Cross Sectional		Two hundred forty three (243) female students aged 18-25 from Zayed University, Abu Dhabi,	• The prevalence of obesity plus overweight altogether was thought to be 28.4 % (n = 69). • "The Pearson correlation suggested that WC, BF, and NC were significantly positive with regards to obesity, (r = 0.790; r = 0.758; r = 0.767, p < 0.001), respectively." • Multiple regression analysis revealed, only NC (Beta: 1.627, 95 %CI: 0.370, 2.846, p < 0.001) and WC (Beta: 0.464, 95 %CI: 0.135, 0.664, p < 0.001) were found to be independently associated with obesity.	[10]
9	Inflammatory markers and cardiovascular risks among overweight-obese Emirati women	Cross-sectional survey	2016	One hundred ten "healthy" overweight/ obese Emirati women attending nutrition counselling clinics were randomly recruited.	• Criteria of diagnosis: 45 % women for metabolic syndrome • Positive correlation: hsCRP with waist circumference (p = 0.018) and body fat (p = 0.002), BMI (p = 0.002). • Positive correlation: IL-6 with waist circumference (p = 0.019) and adiponectin with HDL (p = 0.007). • HDL prevalence <1.3 mmol/L or triglycerides ≥1.7 mmol/L were 82 %, hypertension 27 and 37 %, and dysglycemia 31 %, of women had either 'moderate' or 'high' calculated cardiovascular 10-year risk score."	[12]

MANAGEMENT OF OBESITY

A contemporary strategy related to obesity management acknowledge the multifactorial determinants of gaining weight and healthcare benefits to be derived from the loss of weight. Foundational to any weight loss effort is increased physical activity, diet and lifestyle changes. Two studies were conducted on the management of obesity. Of the 2 studies reporting management of obesity, one was retrospective medical records review [11], and one was intervention program [13].

Table 23: Published papers on the management of obesity in UAE in 2007-2016

No	Title	Study design	Year	Study population	Study key findings	Reference
1	Can our residents carry the weight of the obesity crisis? A mixed methods study.	Retrospective medical records review	2015	Internal medicine resident clinic in an academic medical centre in the UAE. A focus group was then held with a convenience sample of 20 Internal Medicine residents. Questions	• From 155 patients observed in the resident clinic in 202 and 2013, (representing 766 patient encounters), 102 (66%) successfully met the obesity criteria and 50 (32%) met the overweight criteria. • In spite of the high prevalence, only 9% had BMI or obesity documentation in their medical records. • 6% were referred to a dietician and Six percent were offered either exercise or diet advice • The results of focus groups demonstrated had adequate knowledge, however, lacked training in management of obesity and acceptable counselling time. • Feelings of incompetence and weight biases may exist among our trainees.	[11]
2	Lifestyle Intervention for Weight Loss: a group-based program for Emiratis in Ajman, United Arab Emirates	Intervention program	2016	45 participants with obesity and/or type 2 diabetes based on inclusion/ exclusion criteria. The LIFE-8 program was executed by incorporating dietary modification, physical activity, and behavioural therapy	• A reduction in waist circumference (Δ=4±4 cm, P<0.01), fat mass (-7.8%, P<0.01), and body weight (4.8±2.8 kg; 95% CI 3.7-5.8), in the 28 recruited participants was observed. • FBG (8.2±2.0 mmol/L vs 6.8±0.8 mmol/L) and HbA1c (7.1%±1.0% vs 6.6%±0.7%) improvements was found in individuals with type 2 diabetes and obesity after a program. • Overall, program evaluation and increase in nutritional knowledge was favourable • On 1-year follow-up, it was found that the participants could sustain weight loss (-4.0%), while obese, type 2 diabetic participants sustained HbA1c (6.6%±0.7% vs 6.4%±0.7%) and additionally improved (P<0.05) the FBG (6.8±0.8 mmol/L vs 6.7±0.4 mmol/L) levels.	[13]

CURRENT SITUATION AND FUTURE CHALLENGES

Due to the increasing prevalence of Obesity in UAE [22, 5, 8, 9, 10, and 14] and the studies summarized, this report aims to assess the status of Obesity management [11, 13], and risk factors [1, 3, 4, 6, 7, 8, 9, 10, 12] of patients suffering from Obesity.

Epidemiology and prevalence concerning obesity is rising. The causes of obesity often comprise of genetic disposition and are usually multifactorial, having reduced expenditure of energy and high fat diet. The condition of obesity is also a risk factor for several other chronic conditions. Obesity treatments takes in numerous different approaches as well as necessitates an alteration in the dietary intake. Change in dietary habits can assist in reducing the risks of health linked with the condition of obesity that are perceived in different aspects; from the diet of normal weight people to reach a cultural ideal [22, 5, 8].

In UAE, the condition of obesity remains to be a major issue for the health of public. Forbes ranked UAE number 18 on a list of world's fattest nations, estimating 68.3% of its citizens to be obese, and so it makes this small country one of the top most area which is plagued with higher rates of obesity [15]. The high obesity prevalence across UAE is a major issue as this condition brings numerous co-morbidities that affects even government officials, healthcare professionals, and other individuals. Some of the examples of diseases related to obesity comprises of various Joint Disorders, Bone Disorders, Cardiovascular Disease as well as Diabetes (UAE has the second highest prevalence in the world). For the purpose of raising the obesity awareness, one of the major risk factors for manifold of medical situations- the private and public UAE sectors have launched numerous preventive initiative of health [7].

A plethora of evidence indicates that for few people, several non-communicable diseases such as obesity are attributed to poor lifestyle choices. The government needs to respond duly by adopting policies related to health care to focus on strategies such as self-management and self-care that aids the change in behavior. Thus, by adoption of new behaviors concerning health care, one can lead towards enhanced independence, and empowerment and so limited engagement with the services of health. Hence, by getting engaged within the strategies of self-management, might lead to the changing pattern of life in order to access services of healthcare as opposed to an overall reduction of its use [13].

Midwives, health visitors, and nurses need to have an understanding of the obesity treatment, health risk, and causes related to obesity for enabling them to offer suitable support and care within the multidisciplinary team for their patients and clients. The obesity state is often observed to be a lack of self-inflicted and self-control disease by general population, at worse it results in open hostility and at best it mainly doesn't engender understanding. Healthcare professionals and nurses needs to be aware of their own beliefs and attitudes regarding obesity for ensuring that the care of patients is not judgmental and that the psychological requirements of the client and the patients are being met whenever possible [1].

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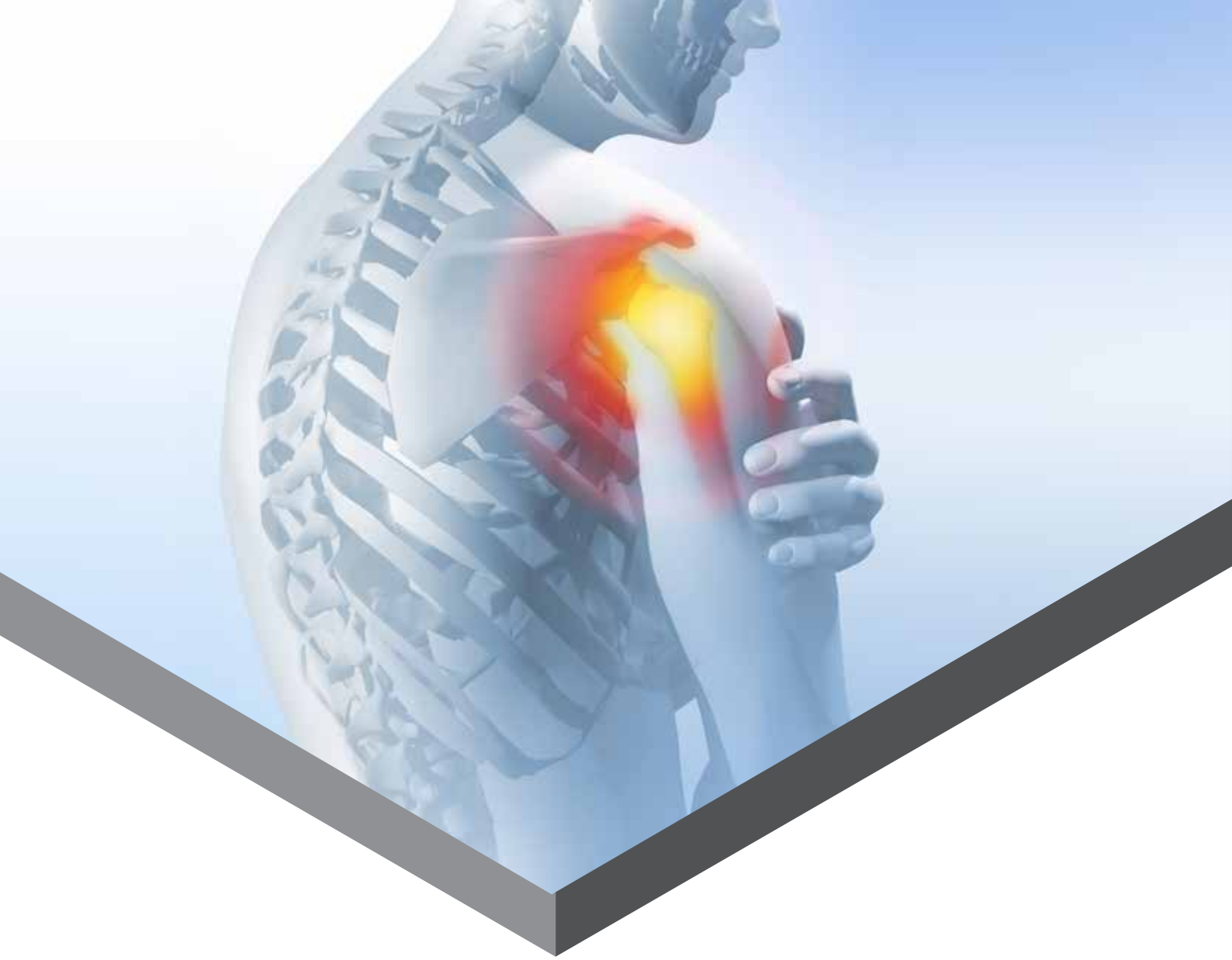


CHAPTER 7
INJURIES

OVERVIEW OF INJURIES

The injuries mainly represent about 12 percent of the global disease burden [47] and was the second leading cause of death for all age groups, with an average of 1,120 deaths per year, between 2000 and 2008 in UAE [48-50]. Within industrialized regions and developing countries, there exists major causes for mortality and morbidity. Injuries can be defined as the damage to which an individual body is not capable to directly adapt and it may have diverse potential consequences. Such conditions may include preventing athletes from continuing to take part in sports, reducing the expectancy of life and quality of life impairment. Eventually, injuries can turn out to be life threatening [1]. Injuries also result from acute exposure from different physical agents for instance, ionizing radiation, chemicals, electricity, heat, and mechanical energy at rates or in amounts beyond the human tolerance threshold [2]. Thus, it is recognized well that both exposure along with its consequences are influenced highly by diverse factors both beyond and within our control.

Different **"sports related injuries"** might be categorized under 2 main types that includes chronic and acute [21]. **Acute injuries** specifically takes the form of fractures and are basically the result of a certain traumatic events including falling off a ski or a skateboard. The **fractures of forearm** are thought to be the most common type of injury among younger population that take part in skateboarding, which often occurs due to the failure to wear the armguards and wrist guards. Injuries can often be caused by the violence acts and accidents and can also occur at play, work and home. These can be due to the effect of blunt objects or via the projects that mainly penetrates in an individual's body. Some of the most common types of injuries includes the broken bones, hematomas, lacerations, abrasions, burns, strains, sprains, and joint dislocation. In the field of injury prevention, injuries caused due to burns are of special significance. Similarly, burn injuries does not take place by chance. There are many known causes that can be controlled or prevented for the purpose of preventing the burn injuries. Therefore, it is essential to understand its epidemiology, risk factors and aetiology.

Injuries are thought to be the leading cause of disability and death for children across UAE. All UAE citizens are more at risk of getting injured both non-fatally and fatally either during sports activity, leisure time, at school or at home than in any other locations. The mortality of injury vary greatly between the states of UAE. In United Arab Emirates, cardiovascular diseases and cancers are the major cause of premature mortality, while injuries alone are considered to be the main cause of severe acquired disability and disfigurement among people aged 65 years and above. Such injuries are known to consume around ten percent of the resources found in the hospitals.

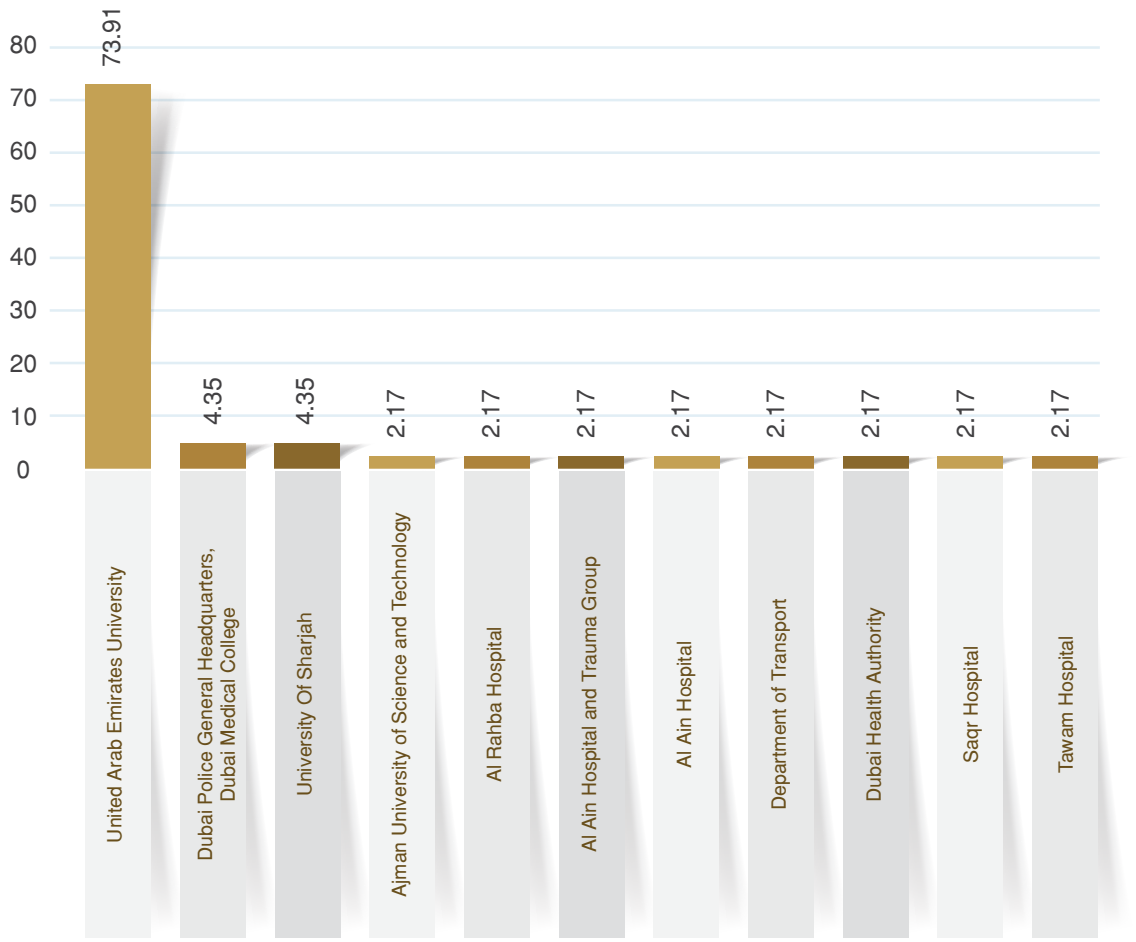
Conventionally, injuries are often considered as unavoidable and random accidents however, within the last few years, an improved and better understanding of the nature of injury have altered these old perceptions and attitudes [22]. Currently, both intentional and un-intentional injuries are demonstrated to be preventable events to a large extent. As a cause of such a shift in the attitudes of individuals, injuries along with its implications have demanded the decision maker's attention across the globe and policy concerning the injury has been firmly placed in the arena of the public health.

The goal of this chapter is to summarize and address published papers developed by UAE institutions on Injuries during the last decade, identify areas of strengths and map the needs in injury research. This chapter provides practical advice for professionals working in injury research. It aims to help them understand what was done on the research and to prioritize their research agenda. The chapter is intended to guide the researchers in the UAE and may also be useful for policy-makers and mid-senior public health officers.

STATISTICS RELATED TO PUBLICATIONS

Eleven institutions in UAE participated in publishing papers on injuries. Forty-six papers were published on injuries during 2007-2016 by UAE institutions (Annex 1). Around, 11 institutions took part in the publications in the same period. It is to be noted that one paper was published by an MOHAP hospital (Saqr hospital in Ras Al Khaima) as indicated in Figure 7.

Figure 7: Percent of participation in injuries research by institution in UAE, 2007-2016



During 2007-2016, the papers on injuries were published in 23 journals (Annex 2). The five journals of highest impact factors included PLoS One (3.53), Journal of Science and Medicine in Sport (3.079), Injury (2.46), Accident Analysis & Prevention (2.07) and Clinical Journal of Sport Medicine (2.01).

DESCRIPTION OF STUDIES

PREVALENCE OF INJURIES

Approximately, 33% of papers were published on the prevalence of injuries. While, 21 studies were conducted to estimate the prevalence of injuries (Table 24). Three of the prevalence studies were conducted at the national level while the rest conducted in two states of United Arab Emirates. 15 studies in Al-Ain and 3 studies in Dubai. Of the 21 studies reporting on injury prevalence, 12 were cross sectional studies, one was observational survey, and 7 retrospective cohort studies (Table 24).

Table 24: Published papers on the prevalence of injuries in UAE in 2007-2016

No	Title	Study design	Year	Study population	Study key findings	Refe rence
1	Prevalence and issues in non-use of safety belts and child restraints in a high-income developing country: lessons for the future	A cross sectional survey	2008	2003-2004 in Al Ain, population 400,000 and the main desert city of UAE, used random sampling of petrol stations	• Safety belts were wore by 29% of drivers. • 14% adult front-seat; • 2% adult rear-seat passengers.	[2]
2	Epidemiology of geriatric trauma in United Arab Emirates	Retrospective data collection	2008	The data of Al-Ain Hospital Trauma Registry were prospectively collected over a period of 3 years (2003-2006). All elderly trauma-patients above 60 years who were admitted to surgical ward or who died on arrival were studied.	• 41% of injuries occurred at home. The mean (range) hospital stay was 12.4 (1-150) days. • 6 patients (5%) were admitted to the ICU. • Overall Mortality was 6% (7 patients), of whom 5 were pedestrians hit by cars."	[3]
3	Occupational injury in the United Arab Emirates: epidemiology and prevention	Data from trauma registry	2009	Surgical admissions from March 2003 to April 2005 were recorded in the registry at the main trauma hospital in Al Ain city (population 348,000).	• 614 hospitalizations due to occupational injury; incidence: 136/100,000 workers/year.98% of injuries was found in males, [25-44 age group] (non-nationals 96%; 69% nationals). • External causes comprised of powered machines 11%, burns 6%, falling objects 15%, falls 51%, and animal-related 7%.	[4]

No	Title	Study design	Year	Study population	Study key findings	Reference
4	The medico-legal scene in Dubai: 2002-2007	Cross sectional study	2009	Various characteristics of the medico-legal scene in Dubai are described, along with an overview of all cases examined over a period of 6 years.	• In the "Department of Forensic Medicine of Dubai Police General Headquarters", a total of "17,683 cases" were assessed during this period. • It therefore, instituted an average of 2947.16 annually.	[5]
5	Factors affecting anatomical region of injury, severity, and mortality for road trauma in a high-income developing country: lessons for prevention	Data of the Trauma Registry	2009	Trauma Registry of Al Ain city were collected prospectively over 3 years (2003-2006) at the main trauma hospital. For traffic injuries	• General rate of mortality 4%; pedestrians- 61% deaths. • Mean hospitalization rate: 9.7 days; ICU: 13% of Patients; Mean stay in ICU: 6.5 days.	[7]
6	Drowning in a high-income developing country in the Middle East: newspapers as an essential resource for injury surveillance	Newspapers surveillance	2009	Three main national English and six Arabic newspapers were assessed for electronic retrieval of incidents and compared with Ministry of Health reports for 1998-2002.	• Clippings incidence was 0.50 drownings /100,000 population/year and from Ministry reports, 0.27	[8]
7	Road traffic accidents in Dubai, 2002-2008.	A cross-sectional study	2010	Secondary data for the period from 2002 to 2008	• A steady increase in the number of road traffic injuries were reported in Dubai, from 2203 in the year 2002 to 3043 in the year 2008. • This represented a 38% of increase • The mortality associated demonstrated a similar trend with an overall increase of 54% during the same period • The distribution of age of road traffic injuries per 100 000 in the population demonstrated 2 peaks in the age group of 18 to 26 years and 63 to 71 years. • Trends in road fatalities are rising among the expatriates and UAE nationals. • RTIs were more common found with the presence of trucks and on roads with high speed limits • Additional studies are required to identify its associated risk factors.	[10]

No	Title	Study design	Year	Study population	Study key findings	Reference
8	Vascular injuries following road traffic collisions in a high-income developing country: a prospective cohort study	Prospective data collection	2010	Data were collected prospectively on road traffic collision injuries in the whole city of Al-Ain, United Arab Emirates, from April 2006 to October 2007	• From 1008 recruited patients in the registry, 13 suffered from vascular injury, with a calculated incidence of 1.87 cases/100 000 inhabitants/ year. • These comprised of one motorcyclist, four pedestrians and eight car occupants. • ICU, hospital stay and severity score of injury were higher significantly in vascular injury group than non-vascular group (P < 0.0001). • 3 patients died (23%); 1 because of the rupture of thoracic aorta and two because of severe liver trauma.	[11]
9	Profiling genitourinary injuries in United Arab Emirates	Prospective data collection	2011	All patients with genito-urinary injuries from the Trauma Registry of Al-Ain Hospital were studied. The registry data was prospectively collected from March 2003 to March 2006.	• In the registry, out of 2573 patients, 22 had GU injuries (2.0 per 100,000 inhabitants/ year; incidence: 0.9%). • The most frequent mechanism of injury included road traffic collision (50% of all cases). • Mean total hospital stay, injury severity score, and patients percentage needed for admission in ICU were high in individuals with Genitourinary injuries in comparison to non-Genitourinary patients (17.1 vs. 5.5 (P 0.001), 15.4 vs. 9.2 days (P 0.040) and 43% vs. 8%, (P 0.0001)."	[14]
10	Camel-related injuries: prospective study of 212 patients	Prospective data collection	2012	All patients who were admitted to Al-Ain Hospital with a camel-related injury were prospectively studied during the period of October 2001 to January 2010.	• In Al-Ain City, the estimated incidence of hospitalized "camel-related injured patients" was 6.88/100,000 population annually.	[20]

No	Title	Study design	Year	Study population	Study key findings	Reference
11	Suicide rates in the national and expatriate population in Dubai, United Arab Emirates	Retrospective data collection	2012	Registered suicides in Dubai from 2003 to 2009 in Dubai, and aggregated socio-demographic data of suicide victims were analyzed.	• The rates of suicides among the expatriates population were 7 times higher than the rates among nationals. • The rates of male suicide within both groups were more than 3 times high as compared to the females. • Most of the victims of suicide includes males, older than thirty years; employed; single; expatriate; with secondary school level education and below	[24]
12	Child and youth traffic-related injuries: use of a trauma registry to identify priorities for prevention in the United Arab Emirates	Prospective data collection	2013	"193 youth and children with traffic injuries for more than 24 hour surgical wards; Al Ain; main trauma hospital; a 36-month period (2003-2006).	• Male-to-female victim ratio 6.7:1; • bicyclists, pedestrians, and motorcyclists (between 10:1 and 12:1); drivers it was 33:0; male: female ratio was 1.4:1, injured females were largely rear-seat passengers	[28]
13	Role of a poison centre in reducing unintentional childhood ingestion by targeting pre-event risk factors	Retrospective review of cases	2013	Review of all cases of unintentional poisoning in children 10 years or younger, who presented at 2 tertiary level emergency care centres during January-December 2010.	• Unintentional poisoning; annual incidence in UAE 2.35/1000 children or younger. • Decreasing incidence mainly for household chemical ingestions.	[29]
14	Seat belt utilisation and awareness in UAE	Observational survey	2013	National	• Rate of overall safety belts across the globe is 61% driver and 43.4% for FSPs with significant differences between 7 emirates constituting a country. • The results demonstrated education level, age, marital status, gender, and nationality of drivers affect wearing habits and perceptions. • Future implications in terms of improving traffic safety awareness are discussed.	[30]

No	Title	Study design	Year	Study population	Study key findings	Reference
15	Sleep-related collisions in United Arab Emirates	Prospective data collection	2013	Data of all hospitalized drivers who were involved in RTC in Al-Ain city were prospectively collected during the period of April 2006-October 2007.	• Contributing factor: 5% Driver's Sleepiness: during collision speed reported = 100km/h; drivers experiencing SRC (79%)	[31]
16	Epidemiology, morbidity and mortality from fall-related injuries in the United Arab Emirates	Retrospective data collection	2014	Fall-related injured patients who were admitted to Al Ain Hospital, United Arab Emirates (UAE) for more than 24 hours or who died after arrival to the hospital, were studied over 3 years.	• Patients who fall from height, as compared to the ones who fall from a similar level, had more males ($p < 0.001$), were older ($p = 0.017$), had higher ISS ($p = 0.011$), were primarily from an Indian sub-continent, and had total hospital stay	[32]
17	Epidemiology of burns in the United Arab Emirates: lessons for prevention	Retrospective study	2014	Burn patients admitted to Al Ain hospital for more than 24h or who died after arrival were studied over 4 years.	• 203 patients were studied, 69% were males and 25% were children under 5 years old. • 28% of patients were injured at work with more men ($p<0.0001$) and non-UAE nationals ($p<0.01$). • Scalds from water, tea were the major hazard at home, while majority of burns at work were from gas and flame. • Six (3%) patients died and nine (4%) were transferred to the specialized burn center.	[33]
18	Interpersonal violence in the United Arab Emirates	Prospective data collected over three years	2014	Hospitalised interpersonal violence-related injured patients in Al-Ain, Trauma Registry United Arab Emirates	• Interpersonal violence; estimated annual injury; in Al-Ain city was reported to be 6.7/100,000 population.	[34]

No	Title	Study design	Year	Study population	Study key findings	Reference
19	Epidemiology of animal-related injuries in a high-income developing country	Retrospective study	2015	Patients admitted to Al-Ain Hospital with animal-related injuries for more than 24 hours or the patients who died in the Emergency Department between March 2003 and March 2007	• Most common injured regions included upper extremities. • There were in total 89 patients of whom 99 percent included males. • The median patient age was 30 (age range 5-89 years old). • The most common injuries included Camel-related injuries (84.3%) that was subsequently followed by cow-related injuries (6.7%). • 88.7% of the injuries occurred at work. • The most common injury mechanism included animal kick (32.6%) followed by falls (30.3%).	[37]
20	Alcohol-related road traffic injuries in Al-Ain City, United Arab Emirates	Prospective data collection	2015	Data of RTC Registry of Al-Ain City were prospectively collected from Al-Ain and Tawam hospitals during the period of April 2006 to October 2007	• From 771 car occupants, there were 15 (94%) males, and sixteen (16) utilized alcohol (2.1%). The range (median) age of the group of alcohol was higher significantly as compared to those without alcohol "(35 (15-53) years compared with 26 (1-78) years, p = 0.02)." • In the group of alcohol (P = 0.03), the locals were considerably more (P = 0.01). • The revised score of trauma was suggestively less. In the alcoholic population, face and head were the most frequently injured areas	[40]
21	Injuries from falling objects in the United Arab Emirates.	Cross-sectional study	2015	Al Ain Hospital; Trauma patients; falling objects injury; admitted >24 hours or dead on arrival Duration: 3 years	• 149 patients with mean age (SD) > 34 (12.1) years. • Annual hospitalization incidence; 10.7/100,000 persons annually.	[42]

RISK FACTORS OF INJURIES

Around, 28 published papers studied risk factors on injuries. One of the risk factors studies was conducted at the national level while the rest conducted in two states of United Arab Emirates. 26 studies in Al-Ain and one study in Dubai. Of the 28 studies reporting on risk factors of injury, 22 studies were cross sectional studies, 1 study was observational survey and 5 were retrospective cohort studies (Table 25).

Table 25: Published papers on the risk factors of injuries in UAE in 2007-2016

No	Title	Study design	Year	Study population	Study key findings	Refe rence
1	Prevalence and issues in non-use of safety belts and child restraints in a high-income developing country: lessons for the future	A cross sectional survey	2008	2003-2004 in Al Ain, population 400,000 and the main desert city of UAE, used random sampling of petrol stations	• Safety belts usage was higher among drivers who were old. • The main reason for non-usage of safety belt comprised of dangerous 3%, carelessness 13%, uselessness 17%, forgetfulness 25%, and forgetfulness 25%%. • Among the residents, 15% believed seat belts are dangerous. In about 68% vehicles, tinted glass were also present.	[2]
2	Epidemiology of geriatric trauma in United Arab Emirates	Retrospective data collection		The data of Al-Ain Hospital Trauma Registry were prospectively collected over a period of 3 years (2003-2006). All elderly trauma-patients above 60 years who were admitted to surgical ward or who died on arrival were studied.	• In total, there were 121 patients, (55 females, and 70 males). • The mean age was 69 years (60-100), 42% were United Arab Emirates (UAE) nationals. • The two most common mechanism of injury included falls (55%) followed by road traffic collisions (RTC) (32%). • The median ISS (range) of the group was 5 (1-34). • The ISS median (interquartile range) of falling down, RTC, and fall from height were 4 (4-9), 6 (4-10), and 8 (5-9), respectively (p=0.31). • 41% of injuries occurred at home. The mean (range) hospital stay was 12.4 (1-150) days. 6 patients (5%) were admitted to the ICU. • Overall mortality was found to be 6% (7 patients), of whom 5 were pedestrians hit by cars.	[3]
3	Occupational injury in the United Arab Emirates: epidemiology and prevention	Data from trauma registry	2009	Surgical admissions from March 2003 to April 2005 were recorded in the registry at the main trauma hospital in Al Ain city (population 348,000).	• Mean hospitalization duration is 9.4 days, with "36% hospitalized" for >1 week.	[4]

No	Title	Study design	Year	Study population	Study key findings	Reference
4	The medico-legal scene in Dubai: 2002-2007	Cross sectional study	2009	Various characteristics of the medico - legal scene in Dubai are described, along with an overview of all cases examined over a period of 6 years.	• The clinical injuries included a total of 10,165 (57.48%) cases, 38 (0.21%) miscellaneous cases, 61 (0.34%) civil actions, 20 (0.11%) criminal abortion, 58 (0.32%) medical responsibility, 409 (2.3%) age estimations, 1525 (8.62%) clinical cases of sexual crimes, and 5404 (30.56%) postmortem examinations. • From the postmortem examinations, 558 (10.3%) were females and 4846 (89.7%) of them included males. • Mean age was found to be 40.5 years and the age ranged from 0-90 years. • The peak incidence was in 20-50 years age group, where the age extremes were least represented • An autopsy accounts for 394 cases, it constitutes 7.29% of all deaths assessed. The 4 manners of deaths in descending frequency order included homicidal 164 (3%), suicidal 498 (9.2%), accidental 1727 (32%), and natural 3003 (55.57%). Over 6 year period, the manner was not determined in 12 (0.22%) of the cases.	[5]
5	Factors affecting anatomical region of injury, severity, and mortality for road trauma in a high-income developing country: lessons for prevention	Data of the Trauma Registry	2009	Trauma Registry of Al Ain city were collected prospectively over 3 years (2003-2006) at the main trauma hospital. For traffic injuries	• There were around 1070 patients, 25% UAE nationals and 89% male, with a mean age of 31 years. • Expatriates, primarily from the low-income countries and non-Arabic speaking accounted for 88% of injured pedestrians • Whereas, the nationals were overrepresented among motorcyclists 37% and vehicle occupants (29%). • Mortality: 4%; 61% of deaths- pedestrians; mortality predictors ISS ($p<0.01$); GCS ($p<0.001$), as well as systolic BP on admission ($p<0.03$).	[7]

No	Title	Study design	Year	Study population	Study key findings	Reference
6	Drowning in a high-income developing country in the Middle East: newspapers as an essential resource for injury surveillance	Newspapers surveillance	2009	Three main national English and six Arabic newspapers were assessed for electronic retrieval of incidents and compared with Ministry of Health reports for 1998-2002.	• Clippings incidence was 0.50drownings /100,000population/year; Ministry reports, 0.27. Most common actions include: Swimming (49%) • Activity including boating or swimming and purpose of activity for example occupational or recreational were unreported by the Ministry. • Activity was observed in 100% of newspaper clippings. • Swimming (49%) was considered to be the most common activity. • The purpose of 17% of cases was classified as occupational. • Gender was 100% complete in both sources. • In newspaper reports, age was classifiable as child or adult, while the Ministry used age groups. • National citizenship was 100% reported by Ministry; 91% of newspaper reports included nationality, providing details for expatriates.	[8]
7	Vascular injuries following road traffic collisions in a high-income developing country: a prospective cohort study	Prospective data collection	2010	Data were collected prospectively on road traffic collision injuries in the whole city of Al-Ain, United Arab Emirates, from April 2006 to October 2007	• Common anatomical sites (n = 4) comprised of upper limb vascular injuries that is followed by thoracic aorta (n = 3). • All injuries of the thoracic aorta included acceleration injuries (moving vehicle hitting a pedestrians).	[11]
8	Terrestrial snakebites in the South East of the Arabian Peninsula: patient characteristics, clinical presentations, and management	retrospective review of medical records	2011	snakebite cases over four-year duration at three tertiary hospitals in Al-Ain, United Arab Emirates (UAE) and Buraimi, Sultanate of Oman	• Sites of snake bite; 95% predominantly from hands to feet • Three hospitals; Treatments from antibiotics: intravenous fluids; polyvalent anti snake venom (ASV); tetanus toxoid; analgesia; cephalosporins; cloxacillin; and ampicillin.	[13]

No	Title	Study design	Year	Study population	Study key findings	Reference
9	Examining traffic flow and speed data: determining imitative behavior.	Cluster analysis	2011	A standard traffic counter was used to collect for a period of 8 days. Effects will be examined on an hourly basis to determine whether time of day has any effect upon the outcome	• Various driver group analysis was performed- similar to the contagion theory. Two drivers groups: lower speed and high-speed drivers tend to stay stable relatively in numbers as expected. • Two of the groups that were intermediate demonstrated an imitative behavior signs.	[15]
10	Motorcycle-related injuries in the United Arab Emirates	Prospective data collection	2012	Patient data were retrieved from Al-Ain Hospital Trauma Registry during four and half years (March 2003-October 2007).	• 6% - in-hospital mortality; national victims UAE were young significantly; had other abdominal injuries than expatriates having injuries of lower limb.	[16]
11	Trauma in women of child-bearing age in a high-income developing country	Trauma registry	2012	Data were collected from Al-Ain Hospital (United Arab Emirates-UAE) Trauma Registry. Females aged 16 to 45 years (child-bearing age) who were admitted with trauma between March 2003 and March 2006 were included in the study	• In females (p=0.04), burns and cervical fractures were higher than in males (p=0.001). • Conversely, lumbar fractures were suggestively higher in males (p=0.03). In females, spinal fractures was diagnosed in 7%, pelvic fractures in 6.4%, as well as both injuries in 1.2%. 1.7% or three females died, because of RTC.	[17]
12	Epidemiology of head injury in the United Arab Emirates	Prospective data analysis of Trauma registry	2012	Trauma patients with head injury who were admitted to Al- Ain Hospital for more than 24 hours and those who died in the hospital were included in the study. Data were prospectively collected [March 2003 - March 2006]	• 589 patients were studied, and 521 were males (88.3%). • The median (range) age was 30 (1-89) years. • Fall from height (11.9%); Road traffic collision (67.1%); patient who died had a significantly high score for Abbreviated Injury Scale of the head (p<0.0001), lower Glasgow Coma Scale (p<0.0001), and high Injury Severity Score (p<0.0001).	[18]

No	Title	Study design	Year	Study population	Study key findings	Reference
13	Camel-related injuries: prospective study of 212 patients	Prospective data collection	2012	All patients who were admitted to Al-Ain Hospital with a camel-related injury were prospectively studied during the period of October 2001 to January 2010.	• Camel bites (25.0 %); fall from a camel (26.4 %); kicks from camels were most common (36.8 %) • 12 patients (5.7%) admitted; falling from a camel and camel kicks. • 2 patients died (1 % overall mortality); mean stay in the hospital 8.6 days (1-103 days).	[20]
14	Camel bite injuries in United Arab Emirates: a 6 year prospective study	Prospective study	2012	All patients admitted to Al-Ain Hospital with a camel bite were prospectively studied during the period of October 2001-October 2007.	• 97% from Indian sub-continent; in camel rutting season (November-March), majority of the injuries occurred (73%); injuries mainly occurred in the head and face (15%), and upper limb (64%); mean stay in hospital; 6 days. 3% death occurred.	[23]
15	Bicycle-related injuries requiring hospitalization in the United Arab Emirates	Prospective data collection	2012	All patients with bicycle-related injuries who were admitted to Al-Ain Hospital or who died after arrival were studied. Data were prospectively collected over a period of six years (October 2001-October 2007).	• None of the patient wore helmet. The local percentage <15 years was high (65.2%) than expatriates (14.3%) ($p<0.0001$, Fisher's Exact Test). • Common injury mechanism for UAE nationals included falling from a bicycle (73.7%) whilst for non-UAE nationals was to hit a moving vehicle (66.7%). • Head and face injuries- 96 (73.9%); extremity injuries; 91 patients (70%). • Admission in ICU's 17 patients (13.1%). 2 patients died due to injury of head (overall mortality was 1.5%).	[25]

No	Title	Study design	Year	Study population	Study key findings	Reference
16	Pediatric and youth traffic-collision injuries in Al Ain, United Arab Emirates: a prospective study.	Prospective data collection	2013	All RTC injured children and youth (0-19-year-olds) who were admitted to Al Ain City's two major trauma centers or who died after arrival to these centers were prospectively studied from April 2006 to October 2007.	• 245 patients were studied, 5% bicyclists, 9% motorcyclists, 15% pedestrians, and 69% were vehicle occupants. • 67% were UAE citizens and 79% were males. • The most common RTC mechanism included rollover of vehicle (37%) followed by front impact collision (32%). • 32 (13%) of vehicle occupants were ejected from car. • 70% of motorcyclists sustained head injuries and 63% of ejected occupants. • Only 2% (3/170) vehicle passengers utilized seatbelts in addition to 13% (3/23) motorcyclists with a helmet.	[26]
17	Child physical abuse: assessment of dental students' attitudes and knowledge in United Arab Emirates	Cross-sectional study	2013	The data were collected by self-administered structured questionnaire completed by 578 under graduate dental students in four (all) dental schools in United Arab Emirates.	• Limited knowledge is available for social indicators, signs of physical abuse and limited knowledge to report procedures among all participants.	[27]
18	Child and youth traffic-related injuries: use of a trauma registry to identify priorities for prevention in the United Arab Emirates	Prospective data collection	2013	One hundred ninety-three children and youth with traffic injuries were admitted for more than 24 h at surgical wards of the main trauma hospital in the Al-Ain region during a 36-month period (2003-2006).	• 41% of the citizens injured in 4-wheel drive sport utility vehicles than 13% of non-citizen. • Head injuries took place in 51% non-occupants, 68% vehicle occupants; with AIS ≥ 3 injuries in 26% occupants and 23 % of non-occupants. • 67% rare occupants have injuries in head.	[28]

No	Title	Study design	Year	Study population	Study key findings	Reference
19	Sleep-related collisions in United Arab Emirates	Prospective data collection	2013	Data of all hospitalized drivers who were involved in RTC in Al-Ain city were prospectively collected during the period of April 2006-October 2007.	• During Ramadan (42%), SRC was intensely over-represented along with driving on highways (83%). • A logistic regression model shows that driving during the "lunar Ramadan month ($p<0.0001$, OR=6.36) and on highways ($p=0.037$, OR=3.75)" are considered to be the most significant self-governing contributors to increase SRC odds.	[31]
20	Interpersonal violence in the United Arab Emirates	Prospective data collected over three years	2014	hospitalised interpersonal violence-related injured patients in Al-Ain, Trauma Registry United Arab Emirates	• There were 75 patients (males = 85.3%) having a mean age of 30 years. • 81% had blunt trauma. • The estimated injury annually regarding the interpersonal violence in Al-Ain was calculated to be "6.7 per 100,000 population". • Females were injured more significantly by more severe injuries ($p = 0.003$), at home ($p = 0.005$), and family member ($p = 0.02$). • Two cases of child abuse, and one case for women sexual assault was reported. Mean stay in hospital was 7.87 (14.1) days. • ICU admission: less than 3% (n = 2) with no deaths. Results showed that most of the patients had minor injuries.	[34]
21	Epidemiology of spinal injuries in the United Arab Emirates.	Retrospective data collection	2015	Patients with spinal injuries admitted to Al Ain Hospital, United Arab Emirates (UAE) for more than 24 h or who died after arrival to the hospital were studied over 3 years.	• Most common injury mechanism: traffic collisions (48 %) followed by patients falling from the same level (9 %) and fall from height (39 %). • When compared with other mechanisms, patients falling from a similar level were old ($p = 0.001$) and were mainly females ($p < 0.0001$). • In lumbar regions- spinal fractures were commonly reported (57 %). Five (4 %) patients died and eleven patients (5 %) sustained paraplegia.	[35]

No	Title	Study design	Year	Study population	Study key findings	Reference
22	New Injury Severity Score is a better predictor of mortality for blunt trauma patients than the Injury Severity Score	Retrospective data collection	2015	The data of Al-Ain Hospital Trauma Registry were prospectively collected over 3 years. Data of blunt trauma patients were then analysed retrospectively	• Of 2,573 patients in the registry, 2,115 (82.2 %) suffered blunt trauma at a mean (SD) age of 32 (15.3) years. • Among them, 1,838 (87 %) were male. Model of logistic regression demonstrated that mortality increased significantly by high NISS ($p < 0.0001$), low GCS ($p < 0.0001$),), and low SBP ($p = 0.006$) on admission and arrival.	[38]
23	Pedestrian injuries in the United Arab Emirates	Prospective data collection	2015	All pedestrian trauma patients who were involved with a road traffic collision and admitted to Al Ain Hospital for more than 24 hours or who died in the hospital were included in the study during March 2003-October 2007	• Three hundred and eighteen patients were studied, 279 (87.7%) were males. • Median (range) age was 31 (1-75) years. • UAE nationals were significantly younger than non-nationals (median (range) age of 14 (2-75) years compared with 33 (1-75) years, $p = 0.001$, Mann-Whitney U-test). • The lower limb (57.2%) was the most common injured region followed by the head (46.9%). • Most commonly injured areas: lower limb (57.2%) followed by the head (46.9%). • Main death cause: severe head injury; to reduce the rate of mortality and morbidity, measures for improving the pedestrian safety should be adopted.	[39]
24	Baby walker injury awareness among grade-12 girls in a high-prevalence Arab country in the Middle East.	Cross-sectional study	2015	female students in grade 12 in the United Arab Emirates Multistage random sampling selected 4/8 female Arab government schools and 3 classes each from science and arts tracks for interview by self-administered questionnaire	• 90% (n = 619) of the families used/had used BWs. • 16% perceived that Baby walker can cause an injury; regardless of causing numerous injuries, together with fatalities, baby walker were perceived to be harmless and were utilized by almost all families.	[41]

No	Title	Study design	Year	Study population	Study key findings	Reference
25	Injuries from falling objects in the United Arab Emirates.	Cross-sectional study	2015	All trauma patients who were injured by falling objects and were admitted to Al Ain Hospital for more than 24 hours, or died after arrival to the hospital were studied for over 3 years	• Common injury location was work (88.6%), along with home (9.4%). At home, patients injured were younger ($p < 0.0001$), and were more females ($p < 0.0001$). • Most common regions of injury: neck/head and extremities; 1.3% of patients died. • Indian sub-continent males was at a huge risk of getting injuries by falling objects specifically at work. • Safe programs and education, along with environmental alterations, utilization of protective devices such as special shoes and helmets, proper enforcements to impose safety guidelines can help in reducing the death, disability and hospitalizations caused by these injuries.	[42]
26	Home and other non-traffic injuries among children and youth in a high-income Middle Eastern country: a trauma registry study	Trauma registry	2015	Children and youth with nontraffic injuries were admitted for >24 hours at surgical wards of the main trauma hospital in Al Ain region during 36 months in 2003-2006	• Unintentional included animal-related (mainly camel) 3% (n = 10), burns 17% (n = 49), falls 65% (n = 191), and others 10% (n = 29). Intentional accounts for 4% (n = 13). • Burns affected mainly 1- to 4-year-old, and falls affected all age groups. 70% of the injuries occurred at home; home falls prevention for all ages; burns of 1- to 4-year-olds are a priority. • The registries encloses pediatric wards and comprise of data on hazardous products and fall locations.	[43]

No	Title	Study design	Year	Study population	Study key findings	Reference
27	Reporting child abuse cases by dentists working in the United Arab Emirates (UAE)	Cross sectional study	2016	A closed-ended, self-administered questionnaire was distributed to 350 dentists working in the UAE.	• Obvious challenge to hinder reporting is the fear of making wrong diagnosis; dentists showing a need for specialized training were more likely to express this fear; (OR = 5.88, 95% CI: 0.07, 0.45; P = 0.00). • Most of the dentist in UAE did not report their suspicion to specialized training and authorities that needs to be provided to build the capacity of dentist in suitably reporting and diagnosing suspicious child abuse cases.	[44]
28	Investigation of drivers' behaviour towards speeds using crash data and self-reported questionnaire	Cross sectional study	2016	Two different datasets were collected from the same drivers' population in AD. The first dataset was obtained from crashes' reports while, the second dataset was obtained from a self-reported questionnaire survey that was carried out among a total of 442 drivers in AD	• The findings revealed that drivers' factors (gender, age, and nationality), vehicle factor (vehicle type), roads and environment factors (weather, road type and speed limit) were the significant factors that affect the occurrence of speed-related crashes in AD. • Drivers' characteristics (i.e., gender, education and income), drivers' responses to speed enforcement and management devices, and drivers' awareness about the importance of such devices in improving traffic safety were the main factors that affecting both drivers' compliance with speed enforcement devices and drivers' involvement in at-fault speed-related crashes.	[45]

MANAGEMENT OF INJURIES

Seven published papers disclosed the strategies to better manage injuries while no papers were published on the diagnosis.

Table 26: Published papers on the management of injuries in UAE in 2007-2016

No	Title	Study design	Year	Study population	Study key findings	Refe rence
1	Towards a national trauma registry for the United Arab Emirates	Trauma registry	2010	Staged approach by developing a single-center registry, a two-center registry, and then a multi-center registry	• Multiple issues arose as well as were resolved during the registry developments for example the regional database design, whether to use web-based system or standalone system of database management along with the security system and usability. • The inclusion of preventive medicine data elements are often crucial in a trauma registry and the primary focus is on the data elements of road traffic collision which is important in a country such a UAE. • The first two registries offered valuable data which has been published and analyzed.	[9]
2	An integrated approach to evaluate policies for controlling traffic law violations	Program evaluation	2010	System approach is introduced to model and to analyse the driver behaviour related to traffic law violations in during 2002-2007 in the Emirate of Abu Dhabi.	• The simulation results reveal promising capability of applying system approach in the policy evaluation studies. • System approached were used, an integrated dynamic simulation model was formed as well as it will be tested to simulate the behaviour of driver for violating a specific traffic law • The dynamic model of simulation aims to address the below queries: • "What" interventions should be implemented to lessen and ultimately control traffic violations which will lead to improving road safety and • (2) "How" to justify those interventions will be effective or ineffective to control the violations in diverse transportation conditions.	[12]

No	Title	Study design	Year	Study population	Study key findings	Reference
3	The legal framework and initiatives for promoting safety in the United Arab Emirates	Policy paper	2012	-	• Setting priorities for injury preventions and safety promotion, it is important to have data on the most current external injury causes and the main environmental, equipment and individual risk factors contributing to injury. • Good quality data for preventing injury are scare • This study aimed at describing the injury scale as a public health concern in UAE along with developing promotion efforts, regulations and safety policies with special focus on the child, occupational, and traffic safety	[19]
4	Prevention of child camel jockey injuries: a success story from the United Arab Emirates	Prospective study.	2012	University Teaching Hospital in Al-Ain city between January 1, 2002, and December 31, 2009.	• 54 patients were recruited, all were males (41 adults, and 13 children) • All children included camel jockeys except 1 child who was riding a camel for fun • None of the camel riders (adults) were a camel jockey • The median patients age (range) admitted before the law included 12.5 (5-45) years, this was significantly less in comparison to 27.2 (20-40) years after its introduction (P = 0.001, Mann-Whitney test). • All 13 children sustained their injuries before the law was implemented, whereas 12 of 41 adults sustained their injuries before the legislation was in place (P < 0.0001, Fisher exact test). • The total hospital stay length of patients was significantly reduced after the law enforcement (P < 0.01, Mann-Whitney test).	[21]

No	Title	Study design	Year	Study population	Study key findings	Reference
5	A holistic approach for assessing traffic safety in the United Arab Emirates	Policy paper	2012	12 potential items were selected to investigate the issue of traffic safety in the country. The investigation included data collection and analyses from official police reports, survey among road-users and interview of traffic safety expert	• The primary factor which contributes to the safety of traffic includes quality of resources, coordination, law enforcement, vehicle, infrastructure, education and training, awareness, and driving behaviour. • Among these factors, a major absence was found in the "driving behaviour", a minor deficiency in "vehicle safety", and a reasonable deficit in the others. • Based on this level of deficiency, the factors recommendations were proposed to progress towards the traffic safety status in the country.	[22]
6	Role of a poison centre in reducing unintentional childhood ingestion by targeting pre-event risk factors	Retrospective review of cases	2013	Review of all cases of unintentional poisoning in children 10 years or younger, who presented at 2 tertiary level emergency care centres during January-December 2010.	• The incidences are declining, specifically for household chemical ingestions • Among native Emirati children, the incidence is twice as high as compared to expatriate children • There was an increase in the synthetic and cosmetics hormone-related poisonings, and in the involvement of younger infants.	[29]
7	Descriptive epidemiology of injury cases: findings from a pilot injury surveillance system in Abu Dhabi	Pilot testing	2016	Health Authority-Abu Dhabi developed a draft electronic and paper-based injury and poisoning notification system (IPNS)	• From 4226 injury cases, there were 3/4th males, mean age was 21.9 and majority were non-UAE nationals. • Multivariate results indicates that non-UAE nationals were 27% more likely to experience fatal, moderate or severe injuries ($p = 0.01$) than to UAE nationals. • People with health insurance were 31% less likely to suffer moderate, severe or fatal injury than those not having any health insurance ($p < 0.001$). • This is the most initial systematically standardized assembly of injury data across 3 facilities in Abu Dhabi, as well as offer prior information on the injury risk factors and characteristics that will aid to classify the need for evidence-based intervention for injury control and prevention.	[46]

CURRENT SITUATION AND FUTURE CHALLENGES

Due to the increasing prevalence of injuries in UAE [2, 3, 4, 5, 7, 8, 10, 11, 14, 20, 24, 28, 29, 30, 31, 32, 33, 34, 37, 40, 42] and the studies summarized, this report aims to assess the status of injuries management [7, 8, 10, 11, 14, 21, 22, 29, 46], and risk factors [2, 3, 4, 5, 7, 8, 11, 13, 15, 16, 17, 18, 20, 23, 25, 26, 27, 28, 31, 34, 35, 38, 39, 41, 42, 43, 44, 45] of patients suffering from injuries.

Non-intentional as well as intentional injury is thought to be a foremost global public health issue [29] including burn injuries. Gradually, improvements are being made on the treatment and rates of survival of the burn-injured patient, while the specialist burn centers are progressively a costly enterprise. The burn injury experience is thought to be devastating for patients both in terms of physical and psychological disfigurement and physical pain. Morbidity and mortality rates are significantly diverse. Epidemiological and etiological patterns indicate that domestic settings are mostly prevalent for the burn injury and elderly plus children continue to be at a huge risk of the injuries caused due to burn. Success has been shown utilizing the approach for health promotions in the area of enforcement, and education. The advantages of the population identification with high rates of hospital admission and causes of specific injury deaths indicates that prevention pathways and causal factors will become apparent that facilitate the activities targeted towards health promotion. Regardless of the effectiveness of such potential lifesaving initiatives, there lies an apparent absences of leadership and political will to limit the rate of incidence of burn injuries in society's most vulnerable population that should be addressed [33].

In majority of incidences, an individual is aware of how to limit the severity and incidence of injuries. One of the biggest challenge for the injury control field is to translate this knowledge into effectual policies and programs that are politically, socially, and economically sustainable and acceptable [2, 3, 4]. The implementation of the research tends to determine the concerns of sustainability, diffusion, and adoption of programs and policies which are significant for enhancing the probable impact of different efficacious interventions. As soon as new strategies are implemented, one may look forward to monitor their impact via surveillance at local and national levels. In various other instances, essential strides in limiting the impact of injury is mainly based on the rigorous epidemiologic investigations and new data.

In order to meet these challenges, it is essential for the field of injury epidemiology to shift from highly descriptive research studies that have prevailed in the previous evidence to the application concerning more rigorous methods of analysis for determining the underlying causal injury patterns [7, 8, 10, 11, and 14]. Research studies mainly focus on the injury descriptive epidemiology and have continuously serve the field well and even more so in numerous other field, as the proximal injury etiology (such as, acute exposure to physical agents for instance, mechanical energy) is known well. Thus, few major innovative advances in the injury prevention will continuously need an additional approach for understanding the complicated assortment of factors mainly influencing the outcomes, severity, and incidence concerning injuries. Similarly, it is critical for investigating this field for conducting demanding evaluations of innovative interventions to better inform the policies and program establishment. Such evaluations needs to be included while assessing both the cost as well as effectiveness of interventions [14, 21, and 22].

One must continue to improve surveillance methods to essentially monitor and define the problem magnitude, specifically non-fatal and intentional injuries [46]. It also needs to expand our work in determining the injury epidemiology and outcomes, mainly focusing on the risk factors and causal patterns for identification. One must foster the application as well as development of demanding techniques for evaluating both health service and preventative interventions. Perhaps most importantly, it is essential to develop an understanding of how one can alter the perceived behavioral, ethical, and legal barriers to control injury into opportunities to limit the injury burden across the globe.

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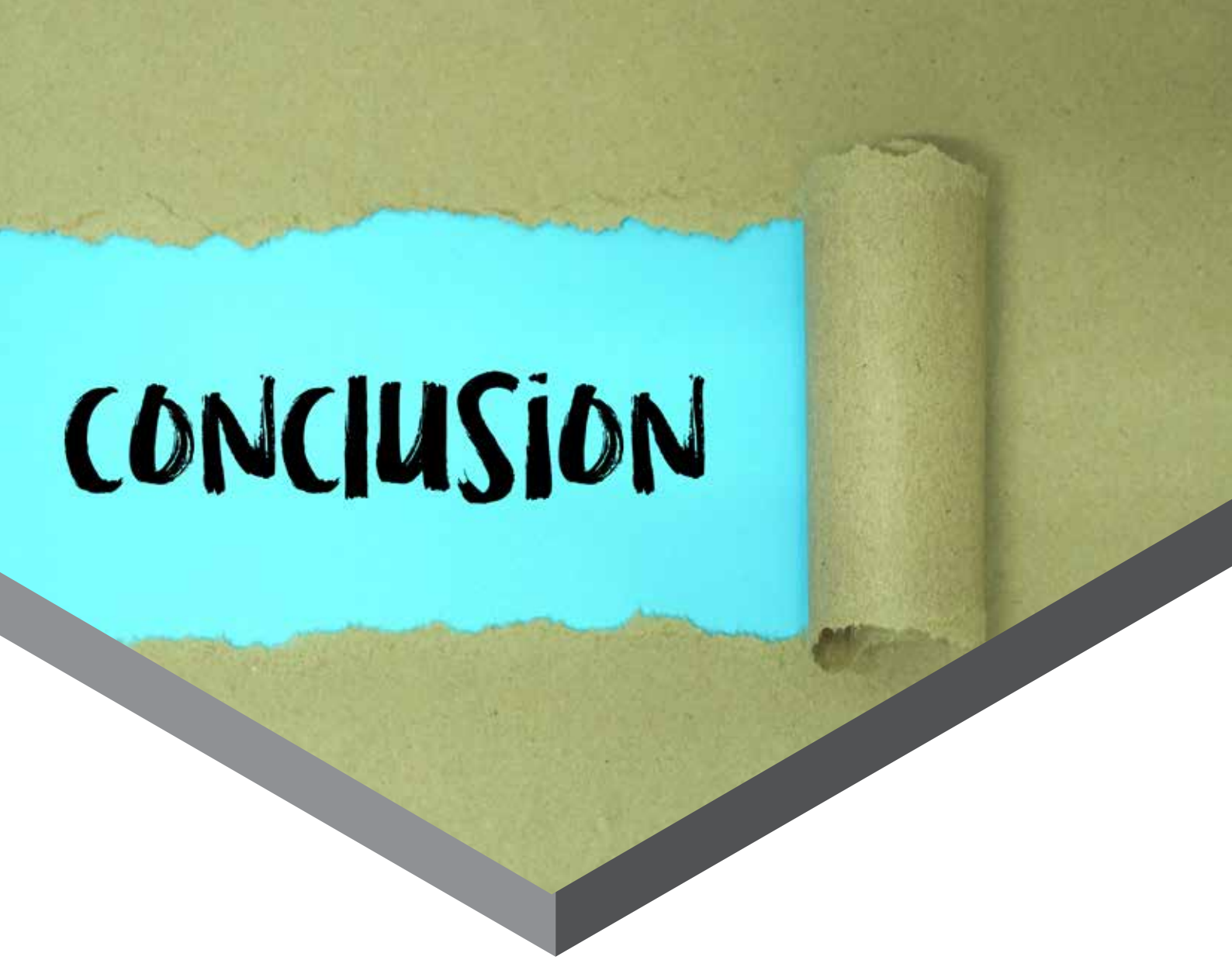

CHAPTER 8

CONCLUSION

CONCLUSION

Non-Communicable diseases represent a growing burden and significant trend across the globe. During the past few years, these were primarily a topic of the developed country as it tends to represent the prime issue for the developing world. Such trends reflect the progressively sedentary lifestyles, rapid unplanned urbanization, and growing societies. Recently, the primary focus of health care in many low and middle-income countries for NCDs is hospital centered acute care. To guarantee timely treatment and early detection, NCDs need to be incorporated into primary health care. Intensifying the primary health care services package to include significant NCD interventions is central to any health system strengthening initiative. One of the global strategy for overcoming this development was the "WHO Action Plan" launched for the "Global Strategy for the Prevention and Control of NCDs". This provides a global vision for responding to the epidemic by incorporating the control and prevention of diseases into local policies, promoting intervention, and research in order to strengthen partnerships for prevention, reduce risk factors, as well as monitor the NCDs along with its determinants.

Reduction of NCDs need a focus on a number of areas. These comprise of improving the supply of system and food, tobacco control, reducing hazardous alcohol intake, better environments for physical activity, and delivering affordable and cost-effective vital technologies and medications. While all of these are essential, a significant percentage of cancer, diabetes, stroke and heart diseases can be prevented if some major risk factors (including unhealthy diets, physical inactivity and tobacco) are eradicated. It can therefore, save millions of early deaths.

Thus, this NCD report highlights significant improvement and growth areas in national response to address the growing burden of NCD. Considerable progress and achievements have been made with continuation in the positive trends in stronger national level capacity. While, overall progress is encouraging, there remains a few areas of concern where one needs to prioritize actions. The major priorities are highlighted as follows:

RECOMMENDATION

IMPLEMENTATION OF POLICIES

Tangible progress in the availability of national operational integrated plans have been made, that reflects its increased importance, and therefore countries are being placed on the need to address the risk factors of NCD's. Efforts are also required to ensure that such plans are being implemented fully and supplementary focus is needed to ensure that the content of these plans reflect a comprehensive approach to address main NCDs and its risk factors. Implementation of policy in the area of unhealthy diet specifically needs strengthening.

CARE, TREATMENT AND DETECTION FOR THOSE WITH EXISTING NCDS

Further improvements are required for the availability of guidelines so as to manage the major NCD's, specifically with chronic respiratory diseases, and cancer. Extensive availability of basic technologies to detect NCDs is required, specifically in the UAE. The early screening programs for different cancers are needed in order to become more systematic and to reach a huge proportion of the target populations.

FUNDING FOR NCD ACTIVITIES

Better leveraging of resources to fund necessary programmatic work is still needed in many regions, specifically funding for palliative care, screening, health promotion, primary prevention, surveillance, and capacity-building.

MULTI-SECTORAL COORDINATION

Strengthened governance mechanisms are also required, especially multisectoral NCD commissions or analogous mechanisms to assist oversees policy coherence, NCD engagement, and sectors accountability beyond health to bring about programme and policy coherence.

PALLIATIVE CARE STRENGTHENING

Strengthen palliative care provision for individuals suffering with end stage NCD in the system of public health needs establishment, precisely in home-based care, community care, and primary health care.

RAISING AWARENESS ABOUT SMOKING CESSATION

Effective health education outreach programs that target young population such as school students before they adopt smoking habits may aid to curb this increasing problem. Active parents and teacher involvement to impart awareness among children with ill effects can assist them to shape their future that may be free from substance use. Increased utilization of internet among adolescent can effectually be harnessed as an informational sources related to the effects of tobacco.

HEALTH PROMOTION

An inclusive strategy to promote health holds actions that are directed at strengthening the capabilities and skills of people to improve their health together with actions that directs towards altering economic, environmental and social situations that may have an impact on an individual's health. Therapeutic lifestyle alterations that target physical activity and food habits through social support and participation of parents are the cornerstone to prevent NCD's such as obesity and cardiovascular diseases. Effective health education and high risk screening programs are immediately required.

APPENDICES

CHAPTER 1: DIABETES

ANNEX (1): LIST OF PUBLISHED PAPERS ON DIABETES MELLITUS IN UAE DURING 2007-2016 BY TITLE AND YEAR OF PUBLICATION

Year	No	Title of the Published Paper
2007	1	Prevalence of risk factors for diabetic foot complications
2007	2	The prevalence of macrovascular complications among diabetic patients in the United Arab Emirates.
2007	3	Quality improvement programme for diabetes care in family practice settings in Dubai.
2007	4	Prevalence of diabetic retinopathy in the United Arab Emirates: a cross-sectional survey.
2007	5	Prevalence of diabetes mellitus and its complications in a population-based sample in Al Ain, United Arab Emirates t
2009	6	Physical activity and reported barriers to activity among type 2 diabetic patients in the United arab emirates
2009	7	Changes of some Health Indicators in Patients with Type 2 Diabetes: A Prospective Study in three Community Pharmacies in Sharjah, United Arab Emirates
2010	8	Assessment of the direct medical costs of diabetes mellitus and its complications in the United Arab Emirates
2010	9	Screening strategy for type 2 diabetes in the United Arab Emirates
2011	10	Diagnostic testing for diabetes using HbA(1c) in the Abu Dhabi population: Weqaya: the Abu Dhabi cardiovascular screening program
2011	11	Prevalence of undiagnosed diabetes and quality of care in diabetic patients followed at primary and tertiary clinics in Abu Dhabi, United Arab Emirates
2012	12	A clinical audit on diabetes care in patients with type 2 diabetes in Al-ain, United arab emirates.
2012	13	Diabetes Mellitus-Related Knowledge among University Students in Ajman, United Arab Emirates
2012	14	Characteristics, management, and in-hospital outcomes of diabetic patients with acute coronary syndrome in the United Arab Emirates
2013	15	Clinical experience with insulin detemir, biphasic insulin aspart and insulin aspart in people with type 2 diabetes: Results from the Abu Dhabi cohort of the A1chieve study

Year	No	Title of the Published Paper
2014	16	Exenatide's effect in reducing weight and glycosylated hemoglobin level in an Arab population with type 2 diabetes
2014	17	Oxidative damage and inflammation in obese diabetic Emirati subjects
2014	18	Vitamin D status and its relationship with metabolic markers in persons with obesity and type 2 diabetes in the UAE: a cross-sectional study
2014	19	Diabetes in the United Arab Emirates: the need for valid datasets for health service planning
2014	20	Patients' Adherence to Anti-Diabetic Medications in a Hospital at Ajman, UAE
2014	21	Prevalence and risk factors for incontinence among Emirati women with diabetes
2015	22	Improving neonatal complications with a structured multidisciplinary approach to gestational diabetes mellitus management
2015	23	The prevalence, risk factors, and screening measure for prediabetes and diabetes among Emirati overweight/obese children and adolescents
2015	24	Cost of Reaching Defined HbA1c Target Using Canagliflozin Compared to Dapagliflozin as Add-On to Metformin in Patients with Type 2 Diabetes Mellitus (T2DM) in the United Arab Emirates (UAE)
2015	25	Incidence of Type 2 Diabetes Mellitus among Emirati Residents in Ajman, United Arab Emirates
2015	26	Bariatric surgery outcomes: a single-center study in the United Arab Emirates
2015	27	Latent Autoimmune Diabetes in Adults in the United Arab Emirates: Clinical Features and Factors Related to Insulin-Requirement
2015	28	Quality of Care for Patients with Type 2 Diabetes Mellitus in Dubai: A HEDIS-Like Assessment.
2015	29	Liraglutide effect in reducing HbA1c and weight in Arab population with type2 diabetes, a prospective observational trial
2015	30	Illiteracy and diabetic foot complications
2015	31	Use of antihypertensive medications in patients with type -2 diabetes in Ajman, UAE
2015	32	Novel approach to systematic random sampling in population surveys: Lessons from the United Arab Emirates National Diabetes Study (UAEDIAB).
2015	33	Gestational diabetes mellitus: Confusion among medical doctors caused by multiple international criteria
2015	34	Vitamin D supplementation in obese type 2 diabetes subjects in Ajman, UAE: a randomized controlled double-blinded clinical trial

Year	No	Title of the Published Paper
2015	35	Characteristics of Patients With Diabetes Having Normal Coronary Arteries
2016	36	Subclinical Inflammation and Endothelial Dysfunction in Young Patients with Diabetes: A Study from United Arab Emirates
2016	37	Spousal Concordance of Diabetes Mellitus among Women in Ajman, United Arab Emirates
2016	38	DiabCare survey of diabetes management and complications in the Gulf countries.
2016	39	Improving adherence to medication in adults with diabetes in the United Arab Emirates

ANNEX (2): LIST OF JOURNALS PUBLISHED PAPERS ON DIABETES MELLITUS IN UAE DURING 2007-2016 BY IMPACT FACTOR

No	Journal Name	Journal IF
1	Diabetes Metab Syndr Obes	4.85
2	Nutrients	4.74
3	Lancet Diabetes Endocrinol	4.42
4	PLoS One	3.54
5	BMC Public Health	3
6	J Diabetes	2.5
7	J Diabetes Res	2.29
8	Eur J Clin Nutr	2.14
9	Korean J Fam Med	1.42
10	Angiology	1.41
11	Int J Endocrinol	1.09
12	J Obstet Gynaecol Res	0.94
13	Malays J Med Sci	0.73
14	Saudi Med J	0.73
15	Acta Med Iran	0.67

No	Journal Name	Journal IF
16	J Neonatal Perinatal Med	0.38
17	Prim Care Diabetes	0.37
18	J Diabetes Metab Disord	0.32
19	J Transcult Nurs	0.24
20	Sultan Qaboos Univ Med J	0.2
21	Value Health	0.1
22	Indian J Endocrinol Metab	0

ANNEX (3): LIST OF AUTHORS/COAUTHORS PARTICIPATED IN PUBLISHED PAPERS ON DIABETES MELLITUS IN UAE DURING 2007-2016 BY THEIR AUTHOR POINTS

No	Author Name	Author point	Insitution
1	Abdi S	5.1	Rashid Center for Diabetes and Research, Ministry of Health, Ajman
2	Abusnana S	5.35	Rashid Center for Diabetes and Research, Ministry of Health, Ajman
3	Elbagir M	5.1	Rashid Center for Diabetes and Research, Ministry of Health, Ajman
4	Tagure B	5.1	Rashid Center for Diabetes and Research, Ministry of Health, Ajman
5	El Essa A	4.99	UAE University, Al Ain
6	Gariballa S	5.24	UAE University, Al Ain
7	Kosanovic M	4.99	UAE University, Al Ain
8	Yasin J	4.99	UAE University, Al Ain
9	Hag-Ali M	4.67	Fatima College of Health Sciences
10	Al Tikriti A	3.79	Imperial College London Diabetes Centre, Abu Dhabi
11	Lessan N	3.79	Imperial College London Diabetes Centre, Abu Dhabi
12	Yasin J	3.79	Cleveland Clinic
13	Shehab A	3.79	Imperial College London Diabetes Centre, Abu Dhabi
14	Aburawi EH	4.04	UAE University, Al Ain

No	Author Name	Author point	Insitution
15	Al Essa A	3.79	UAE University, Al Ain
16	AlKaabi J	3.79	UAE University, Al Ain
17	Lessan N	3.79	UAE University, Al Ain
18	Saadi H	3.79	UAE University, Al Ain
19	Souid AK	3.79	UAE University, Al Ain
20	Zoubeidi T	3.79	UAE University, Al Ain
21	Al Amiri E	3.5	Al-Qassimi Hospital
22	Al Bitar N	3.25	Al-Qassimi Hospital
23	Parish M	3.25	Al-Qassimi Hospital
24	Abdullatif M	3.25	Dubai Health Authority
25	Afandi EZ	3.25	Ministry of Health, Sharjah
26	Abdulle A	3.25	UAE University, Al Ain
27	Albadawi S	2.75	Dubai Hospital
28	Madani A	2.75	Dubai Hospital
29	Alawadi F	2.75	Ministry of Health, Dubai
30	Fikri M	2.75	Ministry of Health, Dubai
31	Abusnana S	2.75	Rashid Center for Diabetes and Research, Ministry of Health, Ajman
32	Mairghani M	2.75	University of Sharjah
33	Sulaiman N	3	University of Sharjah
34	Abusnana S	2.54	Rashid Center for Diabetes and Research, Ministry of Health, Ajman
35	Ahmed SM	2.54	Rashid Center for Diabetes and Research, Ministry of Health, Ajman
36	Sadiya A	2.79	Rashid Center for Diabetes and Research, Ministry of Health, Ajman
37	Skaria S	2.54	Rashid Center for Diabetes and Research, Ministry of Health, Ajman
38	Abusnana S	2.39	Rashid Center for Diabetes and Research, Ministry of Health, Ajman
39	Ahmed SM	2.39	Rashid Center for Diabetes and Research, Ministry of Health, Ajman
40	Ali SH	2.39	Rashid Center for Diabetes and Research, Ministry of Health, Ajman

No	Author Name	Author point	Insitution
41	George M	2.39	Rashid Center for Diabetes and Research, Ministry of Health, Ajman
42	Sadiya A	2.64	Rashid Center for Diabetes and Research, Ministry of Health, Ajman
43	Siddieg HH	2.39	Rashid Center for Diabetes and Research, Ministry of Health, Ajman
44	Tesfa Y	2.39	Rashid Center for Diabetes and Research, Ministry of Health, Ajman
45	Abderahman I	1.67	Al Madhina Health Center, Ministry of Health, Ajman
46	Ibrahim AM	1.67	Al Manama Health Center, Ministry of Health, Ajman Medical District
47	Fouda AM	1.67	Al Musheref Health Center, Ministry of Health, Ajman
48	Al Sharbatti S	1.67	Gulf Medical University, Ajman
49	Muttappallymyalil J	1.67	Gulf Medical University, Ajman
50	Sreedharan J	1.92	Gulf Medical University, Ajman
51	Takana MT	1.67	Mental Health Clinic, Ministry of Health, Ajman Medical District
52	Hameed WA	1.67	Ministry of Health, Ajman
53	Safadi R	1.67	Ministry of Health, Ajman
54	Hassoun S	1.67	Muzeireh Health Center, Ministry of Health, Ajman Medical District
55	Ali SM	1.66	Rashid Hospital
56	Baslaib FO	1.66	Rashid Hospital
57	Binbrek AS	1.91	Rashid Hospital
58	Ali AA	1.66	Sheikh Khalifa Medical City
59	Qatami L	1.34	Bristol-Myers Squibb Company, Dubai
60	Al Awadi FF	1.34	Dubai Hospital
61	Al Madani AA	1.34	Dubai Hospital
62	Al-Ansari J	1.34	Dubai Hospital
63	Saquib S	1.19	Dubai Hospital
64	Othman Y	1.19	Tawam Hospital
65	Agarwal MM	1.44	UAE University, Al Ain
66	Al Kaabi J	1.19	UAE University, Al Ain

No	Author Name	Author point	Insitution
67	Shah SM	1.19	UAE University, Al Ain
68	Abdelgadir EI	0.98	Dubai Hospital
69	Abuelkeir SM	0.98	Dubai Hospital
70	Bachet FE.	0.98	Dubai Hospital
71	Bashier AM	1.23	Dubai Hospital
72	Khalifa AA	0.98	Dubai Hospital
73	Rashid F	0.98	Dubai Hospital
74	Arifulla M	1.23	Gulf Medical University, Ajman
75	Basha SA	0.98	Gulf Medical University, Ajman
76	John LJ	0.98	Gulf Medical University, Ajman
77	Muttappallymyalil J	0.98	Gulf Medical University, Ajman
78	Sreedharan J	0.98	Gulf Medical University, Ajman
79	Altaf Basha S	0.92	Gulf Medical University, Ajman
80	Arifulla M	1.17	Gulf Medical University, Ajman
81	Cheriathu J	0.92	Gulf Medical University, Ajman
82	John LJ	0.92	Gulf Medical University, Ajman
83	Muttappallymyalil J	0.92	Gulf Medical University, Ajman
84	Sreedharan J	0.92	Gulf Medical University, Ajman
85	Afandi B	0.63	Tawam Hospital
86	Rahmani A	0.88	Tawam Hospital
87	Afandi B	0.62	UAE University, Al Ain
88	Al Maskari F	0.62	UAE University, Al Ain
89	Al-Kaabi JM	0.87	UAE University, Al Ain
90	Cragg P	0.62	UAE University, Al Ain
91	Souid AK	0.62	UAE University, Al Ain
92	Abdelgadir EI	0.57	Dubai Hospital

No	Author Name	Author point	Insitution
93	AlAwadi FF	0.57	Dubai Hospital
94	Bashier AM	0.82	Dubai Hospital
95	Eltinay AT	0.57	Dubai Hospital
96	Hussain AA	0.57	Dubai Hospital
97	Thadani P	0.57	Dubai Hospital
98	Abusnana S	0.57	RCDR Centre, Ajman
99	Abdalla ME	0.57	University of Sharjah
100	Abdullah AR	0.49	University of Sharjah
101	Bani-issa WA	0.74	University of Sharjah
102	Hasan HA	0.49	University of Sharjah
103	Raigangar VL	0.49	University of Sharjah
104	Abed YI	0.45	Gulf Medical University, Ajman
105	Al-Sharbatti SS	0.7	Gulf Medical University, Ajman
106	Basha SA	0.45	Gulf Medical University, Ajman
107	Al-Heety LM	0.45	Mushairef Health Center, Ministry of Health, Ajman
108	El Khoury A	0.35	Janssen-Cilag, Dubai
109	Kamal A	0.35	Janssen-Cilag, Dubai
110	Nafach J	0.25	Dubai Diabetes Center, Dubai

CHAPTER 2: CANCER

ANNEX (1): LIST OF PUBLISHED PAPERS ON CANCER IN UAE DURING 2007-2016 BY TITLE AND YEAR OF PUBLICATION

Year	No	Title of the Published Paper
2008	1	The use of a vacuum-assisted biopsy device (Mammotome) in the early detection of breast cancer in the United Arab Emirates
2008	2	Expression of Epstein-Barr virus in Hodgkin lymphoma in a population of United Arab Emirates nationals
2009	3	Acute leukemia among the adult population of United Arab Emirates: an epidemiological study
2010	4	Breast self-examination: knowledge and practice among nurses in United Arab Emirates
2011	5	Opinion of nurses regarding breast cancer screening programs
2011	6	A profile of cases of gestational trophoblastic neoplasia at a large tertiary centre in dubai.
2011	7	Sequential alterations in gastric biopsies and tumor tissues support the multistep process of carcinogenesis
2012	8	Barriers to breast cancer screening and treatment among women in Emirate of Abu Dhabi
2012	9	The use of bevacizumab among women with metastatic breast cancer: a survey on clinical practice and the ongoing controversy
2012	10	Undifferentiated sarcoma of the liver: a rare pediatric tumor
2013	11	Awareness and knowledge about human papillomavirus infection and vaccination among women in UAE
2013	12	Die in a foreign land or forgo cancer care: difficult choices faced by the expatriate workers in the United Arab Emirates
2013	13	Breast self examination practice and breast cancer risk perception among female university students in Ajman.
2013	14	Oral cancer in the UAE: a multicenter, retrospective study
2013	15	Assessing dental students' knowledge of oral cancer in the United Arab Emirates
2013	16	Outcome of patients with acute lymphoblastic leukemia (ALL) following induction therapy with a modified (pulsed dexamethasone rather than continuous prednisone) UKALL XII/ECOG E2993 protocol at Tawam Hospital, United Arab Emirates (UAE).
2014	17	Assessment of Breast Cancer Awareness among Female University Students in Ajman, United Arab Emirates
2014	18	Breast cancer screening awareness, knowledge, and practice among Arab women in the United Arab Emirates: a cross-sectional survey

Year	No	Title of the Published Paper
2014	19	Impact of Oncotype DX testing on adjuvant treatment decisions in patients with early breast cancer: a single-center study in the United Arab Emirates
2014	20	Prevalence and clinicopathological characteristics of appendiceal carcinoids in Sharjah (United Arab Emirates).
2015	21	Patterns of epidermal growth factor receptor mutation in non-small-cell lung cancers in the Gulf region
2015	22	A rare case of hepatocellular carcinoma in the arabian sand cat (felis margarita harrisoni).
2015	23	Characteristics of salivary gland tumors in the United Arab Emirates
2015	24	Perspectives on cervical cancer screening among educated Muslim women in Dubai (the UAE): a qualitative study
2015	25	Age Specific Cytological Abnormalities in Women Screened for Cervical Cancer in the Emirate of Abu Dhabi
2016	26	Gallstones: A Worldwide Multifaceted Disease and Its Correlations with Gallbladder Carcinoma
2016	27	A Content Analysis of Arabic and English Newspapers before, during, and after the Human Papillomavirus Vaccination Campaign in the United Arab Emirates

ANNEX (2): LIST OF JOURNALS PUBLISHED PAPERS ON CANCER IN UAE DURING 2007-2016 BY IMPACT FACTOR

No	Journal Name	Journal IF
1	Cancer	5.64
2	Annals of the New York Academy of Sciences (Ann New York Acad Sci)	5.09
3	PLoS One	3.54
4	Asian Pacific journal of cancer prevention: APJCP (ASIAN PAC J CANCER P)	2.39
5	Medical Oncology (MED ONCOL)	2.13
6	Frontiers in Public Health	2.11
7	BMC Women's Health (BMC Wom Health)	2.09
8	Histology and histopathology (Histol Histopathol)	1.87
9	Journal of gastrointestinal oncology (J Gastrointest Oncol)	1.72
10	Libyan Journal of Medicine	1.51
11	Molecular and Clinical Oncology	1.5
12	Annals of Saudi medicine (ANN SAUDI MED)	1.47
13	ISRN obstetrics and gynecology (ISRN Obstet Gynecol)	1.46
14	International Dental Journal (INT DENT J)	1.18
15	Ecancermedicalscience	1.12
16	Ethnicity & disease (ETHNIC DIS)	1.11
17	Leukemia and Lymphoma (LEUKEMIA LYMPHOMA)	0.85
18	Journal of Zoo and Wildlife Medicine (J ZOO WILDLIFE MED)	0.56
19	Indian Journal of Cancer	0.432
20	Journal of Pain and Symptom Management (J PAIN SYMPTOM MANAG)	0.36
21	Sultan Qaboos University medical journal (Sultan Qaboos Univ Med J)	0.2
22	Asia-Pacific Journal of Clinical Oncology (ASIA-PAC J CLIN ONCO)	0.02

CHAPTER 3: CARDIOVASCULAR DISEASES

ANNEX (1): LIST OF PUBLISHED PAPERS ON CARDIOVASCULAR DISEASES IN UAE DURING 2007-2016 BY TITLE AND YEAR OF PUBLICATION

Year of publication	SN	Title
2010	1	The Abu Dhabi Cardiovascular Program: the continuation of Framingham.
2010	2	Acute coronary syndrome registry from four large centres in United Arab Emirates (UAE-ACS Registry).
2012	3	Characteristics and in-hospital outcomes of patients with acute coronary syndromes and heart failure in the United Arab Emirates
2012	4	Coronary artery disease in Africa and the Middle East
2012	5	Weqaya: a population-wide cardiovascular screening program in Abu Dhabi, United Arab Emirates
2013	6	Requirements for Achieving and Maintaining Competency in the Implantation and Management of Cardiac Implantable Electrical Devices: A clinical competency statement by the Emirates Cardiac Society
2013	7	"Personality traits and heart disease in the Middle East". Is there a link?
2013	8	Pattern of left ventricular hypertrophy seen on transthoracic echo in patients with hypertensive cardiomyopathy when compared with idiopathic hypertrophic cardiomy-opathy.
2013	9	Gender differences in acute coronary syndrome in Arab Emirati women--implications for clinical management
2014	10	Quality of care in primary percutaneous coronary intervention for acute ST-segment -elevation myocardial infarction: Gulf RACE 2 experience
2014	11	Treatment Patterns and Health Resource Utilization Among Atrial Fibrillation Patients in United Arab Emirates and Saudi Arabia
2014	12	Effect of PUFA on patients with hypertension: a hospital based study
2014	13	Rationale, Design, Methodology and Hospital Characteristics of the First Gulf Acute Heart Failure Registry (Gulf CARE).
2014	14	Multicenter cross-sectional study of asymptomatic peripheral arterial disease among patients with a single previous coronary or cerebrovascular event in the Arabian Gulf
2014	15	Pre-participation musculoskeletal and cardiac screening of male athletes in the United Arab Emirates
2014	16	Hospitalized heart failure patients with preserved vs. reduced ejection fraction in Dubai, United Arab Emirates: a prospective study.

Year of publication	SN	Title
2014	17	Assessment of guideline adherence in hospitalised heart failure patients with systolic dysfunction in Dubai, United Arab Emirates
2015	18	The Gulf Implantable Cardioverter-defibrillator Registry: Rationale, Methodology, and Implementation
2015	19	Improving venous thromboembolism risk assessment compliance using the electronic tool in admitted medical patients
2015	20	Reducing Door to- Balloon- Time for Acute ST Elevation Myocardial Infarction In Primary Percutaneous Intervention: Transformation using Robust Performance Improvement
2015	21	Opportunistic Screening for CVD Risk Factors: The Dubai Shopping for Cardiovascular Risk Study (DISCOVERY).
2015	22	Outcomes for out-of-hospital cardiac arrests across 7 countries in Asia: The Pan Asian Resuscitation Outcomes Study (PAROS)
2015	23	Association between acculturation, obesity and cardiovascular risk factors among male South Asian migrants in the United Arab Emirates--a cross-sectional study
2016	24	Validation of the 6-Month GRACE Score in Predicting 1-Year Mortality of Patients With Acute Coronary Syndrome Admitted to the Arabian Gulf Hospitals
2016	25	Exploratory study into the awareness of heart diseases among Emirati women (UAE) and their health seeking behaviour- a qualitative study
2016	26	Lbos 03-01 Prevalence, Awareness, Treatment, And Control Of Hypertension In The Mid-dle East: Results From The Prospective Urban Rural Epidemiology (Pure) Study.
2016	27	Coronary artery disease prevalence and outcome in patients hospitalized with acute heart failure: an observational report from seven Middle Eastern countries
2007	28	The potential of erythropoietin for conferring cardioprotection complementing reperfusion
2008	29	High prevalence of the cardiovascular risk factors in Al-Ain, United Arab Emirates. An emerging health care priority
2008	30	Potential benefits of controlling coronary heart disease risk factors in the United Arab Emirates.
2009	31	Associations of cardiovascular risk factors in Al Ain, United Arab Emirates
2010	32	Meta-analysis of studies of patients in the United Arab Emirates with ST-elevation myo-cardial infarction treated with thrombolytic agents

ANNEX (2): LIST OF JOURNALS PUBLISHED PAPERS ON CARDIOVASCULAR DISEASES IN UAE DURING 2007-2016 BY IMPACT FACTOR

No	Journal Name	Journal IF
1	Eur J Heart Fail.	6.526
2	J Hypertens	6.48
3	Heart Asia.	5.595
4	Resuscitation.	5.41
5	BMJ Qual Improv Rep.	4.99
6	Am J Public Health.	4.552
7	Int J Cardiol.	4.036
8	Cardiovasc Diabetol.	4.015
9	Value Health.	3.279
10	Am J Cardiol.	3.276
11	Angiology.	2.931
12	Kidney Blood Press Res.	2.908
13	Curr Med Res Opin.	2.653
14	Prog Cardiovasc Dis.	2.418
15	BMC Public Health.	2.264
16	Ther Clin Risk Manag.	1.903
17	Am J Cardiovasc Dis.	1.571
18	Coron Artery Dis.	1.55
19	BMC Womens Health	1.353
20	Ann Saudi Med	0.697
21	Saudi Med J.	0.588
22	J Pak Med Assoc.	0.566
23	BMC Res Notes.	0
24	Heart Views.	0

No	Journal Name	Journal IF
25	Indian Heart J.	0
26	Hosp Pract	0
27	Glob Heart.	0
28	Transl Med UniSa.	0

CHAPTER 4: CHRONIC RESPIRATORY DISEASES

ANNEX (1): LIST OF PUBLISHED PAPERS ON CHRONIC RESPIRATORY DISEASES IN UAE DURING 2007-2016 BY TITLE AND YEAR OF PUBLICATION

Year of publication	SN	Title
2008	1	Sputum eosinophil markers in monitoring asthmatic patients in United Arab Emirates
2009	2	Paternal asthma is a predictor for childhood asthma in the consanguineous families from the United Arab Emirates
2010	3	Asthma insights and reality in the United Arab Emirates
2010	4	Prevalence and risk factors of asthma among adolescents and their parents in Al-Ain (United Arab Emirates).
2010	5	Prevalence and prognosis of chronic obstructive pulmonary disease among 8167 Middle Eastern patients with acute coronary syndrome.
2011	6	Prevalence of COPD in Abu Dhabi, United Arab Emirates.
2012	7	Chronic obstructive pulmonary disease in the adult population within the Middle East and North Africa region: rationale and design of the BREATHE study
2012	8	Population prevalence of asthma and its determinants based on European Community Respiratory Health Survey in the United Arab Emirates
2014	9	Economic burden of asthma in Abu Dhabi: a retrospective study
2014	10	Case-finding of chronic obstructive pulmonary disease with questionnaire, peak flow measurements and spirometry: a cross-sectional study

ANNEX (2): LIST OF JOURNALS PUBLISHED PAPERS ON CHRONIC RESPIRATORY DISEASES IN UAE DURING 2007-2016 BY IMPACT FACTOR

SN	Journal	Impact factor
1	Respiratory Medicine	3.036
2	Respiration	2.651
3	Clinical cardiology	2.431
4	BMC Pulmonary Medicine	2.329
5	Journal of Asthma	1.802
6	Annals of Thoracic Medicine	1.45
7	Saudi Medical Journal	0.588
8	BMC Research Notes	0
9	Journal of ClinicoEconomics and Outcomes Research	0

CHAPTER 5: STROKE

ANNEX (1): LIST OF PUBLISHED PAPERS ON STROKE IN UAE DURING 2007-2016 BY TITLE AND YEAR OF PUBLICATION

Year of publication	SN	Title
2007	1	Comparison of two imaging protocols for acute stroke: unenhanced cranial CT versus a multimodality cranial CT protocol with perfusion imaging
2012	2	A prospective study on the use of warfarin in the United Arab Emirates
2015	3	Clinical characteristics, precipitating factors, management and outcome of patients with prior stroke hospitalised with heart failure: an observational report from the Middle East
2013	4	Ischaemic stroke as the first presentation of occult squamous cell cancer.
2013	5	Blunt traumatic internal carotid artery dissection with delayed stroke in a young skydiver
2012	6	Endomyocardial fibrosis causing stroke in a young man
2010	7	Papillary fibroelastoma of the aortic valve--a case report and literature review
2010	8	Association between homocysteine and endothelial dysfunction markers in stroke disease
2009	9	Salivary neuron specific enolase: an indicator for neuronal damage in patients with ischemic stroke and stroke-prone patients
2010	10	Meta-analysis of studies of patients in the United Arab Emirates with ST-elevation myocardial infarction treated with thrombolytic agents

ANNEX (2): LIST OF JOURNALS PUBLISHED PAPERS ON STROKE IN UAE DURING 2007-2016 BY IMPACT FACTOR

SN	Journal	Impact factor
1	American journal of cardiology	3.154
2	Clinical Chemistry and Laboratory Medicine (CCLM)	3.017
3	Nutritional Neuroscience	2.616
4	BMJ Open	2.562
5	The Open Cardiovascular Medicine Journal	1.658
6	Journal of Cardiothoracic Surgery	1.036
7	AUSTRALAS RADIOL	0.86
8	Journal of the College of Physicians and Surgeons Pakistan	0.34
9	BMJ Case Rep	0

CHAPTER 6: OBESITY

ANNEX (1): LIST OF PUBLISHED PAPERS ON OBESITY IN UAE DURING 2007-2016 BY TITLE AND YEAR OF PUBLICATION

Year of publication	SN	Title
2008	1	Barriers to weight management among Emirati women: a qualitative investigation of health professionals' perspectives
2009	2	Prevalence of overweight and obesity among adult females in the United Arab Emirates.
2010	3	Barriers and facilitators of weight management: perspectives of Arab women at risk for type 2 diabetes
2011	4	The Use of Obesity Indicators for the Prediction of Hypertension Risk among Youth in the United Arab Emirates
2013	5	Obesity among adolescents in five Arab countries; relative to gender and age
2013	6	Obesity hypoventilation syndrome in obstructive sleep apnea patients in the United Arab Emirates: a retrospective cross-sectional study
2013	7	Parental weight perceptions: a cause for concern in the prevention and management of childhood obesity in the United Arab Emirates
2013	8	Prevalence of symptoms and risk of sleep apnea in Dubai, UAE.
2013	9	The prevalence and potential determinants of obesity among school children and adolescents in Abu Dhabi, United Arab Emirates.
2015	10	Association of Neck Circumference with Obesity in Female College Students
2015	11	Can our residents carry the weight of the obesity crisis? A mixed methods study
2016	12	Inflammatory markers and cardiovascular risks among overweight-obese Emirati women
2016	13	Lifestyle Intervention for Weight Loss: a group-based program for Emiratis in Ajman, United Arab Emirates
2016	14	Increasing obesity rates in school children in United Arab Emirates

ANNEX (2): LIST OF JOURNALS PUBLISHED PAPERS ON OBESITY IN UAE DURING 2007-2016 BY IMPACT FACTOR

SN	Journal	Impact factor
1	International Journal of Obesity	5.38
2	PLoS One.	3.53
3	Nutricion Hospitalaria	1.25
4	International journal of food sciences and nutrition.	1.20
5	Health and Social Care in the Community	1.15
6	Obesity Research and Clinical Practice	0.70
7	Macedonian Journal of Medical Sciences	0.17
8	BMC Research Notes	0.00
9	Diabetes, Metabolic Syndrome and Obesity	0.00
10	International Journal of General Medicine	0.00
11	International Quarterly of Community Health Education	0.00
12	Iranian journal of public health	0.00
13	JRSM short reports	0.00
14	Obes Sci Pract	0.00

CHAPTER 6: INJURIES

ANNEX (1): LIST OF PUBLISHED PAPERS ON INJURIES IN UAE DURING 2007-2016 BY TITLE AND YEAR OF PUBLICATION

Year of publication	SN	Title
2007	1	Bicycle-related injuries: a prospective study of 200 patients
2008	2	Prevalence and issues in non-use of safety belts and child restraints in a high-income developing country: lessons for the future
2008	3	Epidemiology of geriatric trauma in United Arab Emirates
2009	4	Occupational injury in the United Arab Emirates: epidemiology and prevention.
2009	5	The medico-legal scene in Dubai: 2002-2007
2009	6	Letter to editor--trends in childhood injury mortality in a developing country: United Arab Emirates
2009	7	Factors affecting anatomical region of injury, severity, and mortality for road trauma in a high-income developing country: lessons for prevention.
2009	8	Drowning in a high-income developing country in the Middle East: newspapers as an essential resource for injury surveillance
2010	9	Towards a national trauma registry for the United Arab Emirates
2010	10	Road traffic accidents in Dubai, 2002-2008.
2010	11	Vascular injuries following road traffic collisions in a high-income developing country: a prospective cohort study.
2010	12	An integrated approach to evaluate policies for controlling traffic law violations
2011	13	Terrestrial snakebites in the South East of the Arabian Peninsula: patient characteristics, clinical presentations, and management
2011	14	Profiling genitourinary injuries in United Arab Emirates
2011	15	Examining traffic flow and speed data: determining imitative behavior.
2012	16	Motorcycle-related injuries in the United Arab Emirates
2012	17	Trauma in women of child-bearing age in a high-income developing country
2012	18	Epidemiology of head injury in the United Arab Emirates.
2012	19	The legal framework and initiatives for promoting safety in the United Arab Emirates
2012	20	Camel-related injuries: prospective study of 212 patients

Year of publication	SN	Title
2012	21	Prevention of child camel jockey injuries: a success story from the United Arab Emirates.
2012	22	A holistic approach for assessing traffic safety in the United Arab Emirates.
2012	23	Camel bite injuries in United Arab Emirates: a 6 year prospective study
2012	24	Suicide rates in the national and expatriate population in Dubai, United Arab Emirates
2012	25	Bicycle-related injuries requiring hospitalization in the United Arab Emirates
2013	26	Pediatric and youth traffic-collision injuries in Al Ain, United Arab Emirates: a prospective study.
2013	27	Child physical abuse: assessment of dental students' attitudes and knowledge in United Arab Emirates.
2013	28	Child and youth traffic-related injuries: use of a trauma registry to identify priorities for prevention in the United Arab Emirates
2013	29	Role of a poison center in reducing unintentional childhood ingestion by targeting pre-event risk factors
2013	30	Seat belt utilisation and awareness in UAE
2013	31	Sleep-related collisions in United Arab Emirates
2014	32	Epidemiology, morbidity and mortality from fall-related injuries in the United Arab Emirates
2014	33	Epidemiology of burns in the United Arab Emirates: lessons for prevention
2014	34	Interpersonal violence in the United Arab Emirates.
2015	35	Epidemiology of spinal injuries in the United Arab Emirates
2015	36	Traumatic asphyxia with diaphragmatic injury: a case report.
2015	37	Epidemiology of animal-related injuries in a high-income developing country
2015	38	New Injury Severity Score is a better predictor of mortality for blunt trauma patients than the Injury Severity Score
2015	39	Pedestrian injuries in the United Arab Emirates
2015	40	Alcohol-related road traffic injuries in Al-Ain City, United Arab Emirates
2015	41	Baby walker injury awareness among grade-12 girls in a high-prevalence Arab country in the Middle East
2015	42	Injuries from falling objects in the United Arab Emirates

Year of publication	SN	Title
2015	43	Home and other nontraffic injuries among children and youth in a high-income Middle Eastern country: a trauma registry study
2016	44	Reporting child abuse cases by dentists working in the United Arab Emirates (UAE)
2016	45	Investigation of drivers' behavior towards speeds using crash data and self-reported questionnaire
2016	46	Descriptive epidemiology of injury cases: findings from a pilot injury surveillance system in Abu Dhabi

ANNEX (2): LIST OF JOURNALS PUBLISHED PAPERS ON INJURIES IN UAE DURING 2007-2016 BY IMPACT FACTOR

SN	Journal	Impact factor
1	PLoS One	3.53
2	Journal of Science and Medicine in Sport	3.079
3	Injury	2.46
4	Accident Analysis & Prevention	2.07
5	Clinical Journal of Sport Medicine	2.01
6	Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine	1.92
7	Archives of Gerontology and Geriatrics	1.85
8	Burns	1.83
9	Asia Pacific Journal of Public Health	1.72
10	Occupational Medicine	1.47
11	IInternational Journal of Social Psychiatry	1.33
12	Journal of Emergency Nursing	1.31
13	Traffic Injury Prevention	1.286
14	World Journal of Emergency Surgery	1.062
15	Journal of Forensic and Legal Medicine	0.989
16	Pediatr Emerg Care.	0.923
17	Singapore Medical Journal	0.63
18	International Journal of Injury Control and Safety Promotion	0.544
19	Ulusal Travma ve Acil Cerrahi Dergisi	0.379
20	BMC Research Notes	0
21	European archives of paediatric dentistry	0
22	Journal of Emergencies, Trauma and Shock	0
23	Oman Medical Journal	0

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