TURKISH JOURNAL OF INTERNAL MEDICINE
ISSN:2687-4245
Original Article

A Retrospective Evaluation of Patients Hospitalized in the Internal Medicine Department at the Turkey Recep Tayyip Erdogan Somalia Mogadishu Training and Research Hospital

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ABSTRACT

Background There is limited data on the diagnosis and treatment practice of patients in internal medicine clinics in Somalia. The present study aims to evaluate the diagnostic distributions, demographic characteristics and clinical outcomes of inpatients treated in the department of internal medicine at our hospital.

Material and Methods The demographic characteristics, diagnoses, lengths of hospital stay, and mortality rates of patients hospitalized between January 2017 and June 2019 at the Department of Internal Medicine of the Turkey Recep Tayyip Erdogan Somalia Mogadishu Training and Research Hospital (service and intensive care) were evaluated.

Results A total of 3,246 patients, 1,759 (54.2%) males and 1,487 (45.8%) females, with an average age of 50.82±19.25 (18-101) years, were included in the study. While 76% of the patients were followed up in the general internal medicine service, 13.3% were monitored in the general intensive care unit and 10.7% in the emergency intensive care unit. When the indications for hospitalization were evaluated, the most common causes of hospitalization were chronic kidney disease (CKD) (29.4%) and acute kidney injury (AKI) (14.8%) and the internal problems associated with these conditions (electrolyte imbalance, hypervolemia and acid-base balance deterioration). Other important internal diseases requiring hospitalization were diabetes mellitus (DM)-related conditions (11.9%), anemia (5.2%), hypertensive (HT) emergencies (3.5%), gastrointestinal diseases (4.2%) viral hepatitis (2.1%) cases, conditions that required cancer-related hospitalization (3.6%), infectious diseases (3.3%), cardiovascular diseases (CVD) (3%), and other less frequent causes.

While 2,714 (83.6%) patients were discharged, 510 (15.7%) patients died and 22 (0.7%) patients left the hospital of their own accord. The mortality rates of the patients were found to be 38.6% in the general intensive care unit, 35.9% in the emergency intensive care unit and 25.5% in the general internal medicine service. Higher mortality rates were found in emergency and general intensive care patients compared to patients in the internal medicine service [OR: 7.4 (5.7-9.7), OR: 10.4 (8.2-13.3), respectively, ($p<0.001$)].

Conclusions It was determined that the majority of inpatients evaluated at the Turkey Recep Tayyip Erdogan Somalia Mogadishu Training and Research Hospital had preventable and treatable diseases in the early period. In the health system, which primarily aims to treat patients under current conditions, the development of primary care treatment plans in the future may deliver a significant decrease in mortality and morbidity rates by reducing the frequency and severity of CKD, DM, HT and CVD. There is a need for new and inclusive scientific studies in Somalia on this subject.

Turk J Int Med 2021;3(4):177-187
DOI: 10.46310/tjim.899718

Keywords: *Somalia, chronic kidney disease, diabetes mellitus, hypertension, internal disease, intensive care.*

Received: March 19, 2021; Accepted: May 23, 2021; Published Online: October 29, 2021

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Introduction

It has still not been possible to establish an adequate public health system in Somalia following decades of political turmoil, wars, poverty, and starvation. Infectious and parasitic diseases, especially malaria in infants and tuberculosis and cholera outbreaks in adults, are still important causes of death in this country. The lack of a competent and strong central government capable of providing adequate health system facilities has led to significant growth in the country's private health system. However, fees paid for health services make the sustainability of private health services impossible in a country where poverty is so prevalent. In recent years, with the help of foreign countries and international organizations, significant strategic gains have been achieved in this regard, resulting in the provision of equitable, affordable and effective basic health services for the general population.

Turkey has been offering inpatient and outpatient care services at Turkey Recep Tayyip Erdogan Somalia Mogadishu Training and Research Hospital (SMTERH) since August 2014, to help the people of Somalia in this regard. The hospital, which was brought into service with 201 beds, now has a total of 240 beds and undertakes not only the important task of patient treatment, but also the training of physicians and other healthcare professionals. Patients treated by the internal medicine service and intensive care units of the hospital are mostly those who have chronic illness-related complications because they cannot benefit from basic and preventive health services.

The present study aims to evaluate the diagnostic distributions, demographic characteristics and clinical outcomes of patients receiving inpatient treatment at the SMTERH Internal Diseases Clinic.

Material and Methods

In the study, the data of patients aged 18 and over, who were hospitalized between January 2017 and June 2019 at the SMTERH Internal Diseases Department, were obtained by retrospectively scanning the patient files. Information on patients' comorbid diseases was obtained from the patient files. The presence of documentation on drug use in the previous year was considered sufficient for the diagnosis of hypertension (HT), diabetes mellitus (DM), and chronic obstructive pulmonary disease (COPD). Electrocardiogram, echocardiography, and cardiology clinical notes of patients in the previous 3 months were received for the diagnosis of heart failure (HF). Indications for admission to the inpatient clinics or intensive care units were recorded for metabolic acidosis, hypervolemia, hyperkalemia, severe uremic symptoms, and other causes (gastrointestinal bleeding, emergency surgical interventions, cerebrovascular event, and labor, etc.). The diagnoses of the patients were confirmed by the responsible internal medicine physician and the admission diagnoses were recorded as the first diagnoses.

Patient Follow-up

While the follow-up processes and treatments of the patients were managed by the responsible internal medicine physician during their stay in the hospital, the patients taken to intensive care units were followed up by the internal medicine physicians and anesthesiologists. Patients who needed hemodialysis due to renal failure were hemodialyzed with a temporary and/or permanent tunnel catheter in the hemodialysis (HD) unit of our clinic. In the case of non-invasive and invasive mechanical ventilation, patients were followed up in intensive care units. Patients in need of palliative treatment, analgesia and nutritional needs were given a temporary central venous catheter when necessary. COPD and heart failure patients also received oxygen and diuretic treatment in the internal medicine clinic due to the lack of relevant specialists.

Statistical Analysis

The SPSS 26.0 (IBM Corporation, Armonk, New York, United States) program was used to analyze the variables. The conformity of univariate data to normal distribution was evaluated with the Kolmogorov-Smirnov test. The Mann-Whitney U (Exact) test was used along with the Monte Carlo results to compare two independent groups according to the quantitative data. In comparing categorical variables with each other, the Pearson Chi-Square test was used with the Exact and Monte Carlo Simulation method and the Benjamini-Hochberg corrected p-value results were used in

comparing column ratios with each other and the results were shown in the table. The odds ratio was used with 95% confidence intervals to show how many times those with a risk factor were compared to those without one. Quantitative variables were expressed as mean±SD (standard deviation) and Median (percentile 25/percentile 75) in the tables, while categorical variables were shown as n (%). The variables were analyzed at a 95% confidence level and were considered significant when the p value was less than 0.05.

Results

A total of 3,246 patients, 1,759 (54.2%) males and 1,487 (45.8%) females, with an average age of 50.82±19.25 (18-101) years, were included in the study. While 76% of the patients were followed by the general internal medicine department, 13.3% were followed by the internal medicine department in the general intensive care unit and 10.7% in emergency intensive care *(Table 1)*.

While 2,714 (83.6%) patients were discharged, 510 (15.7%) patients died and 22 (0.7%) patients left the hospital of their own accord. The mean length of hospital stay was found to be 6.59±4.21 (3-81) days *(Table 1)*.

When the indications for hospitalization were evaluated, the most common reason for hospitalization was chronic kidney disease (CKD) (29.4%) and acute kidney injury (AKI) (14.8%) and internal problems associated with them (electrolyte imbalance, hypervolemia, and acid-base imbalance).

Other important internal diseases requiring hospitalization were found to be DM (11.9%) associated conditions, anemia (5.2%), hypertensive emergencies (3.5%), gastrointestinal diseases (4.2%) and viral hepatitis (2.1%), conditions requiring cancer-related hospitalization (3.6%), infectious diseases (3.3%), cardiovascular diseases (3%), and less frequently other causes *(Table 2)*.

There was no significant difference between the hospitalized patients in terms of age and gender distribution for mortality (p>0.05). The length of hospital stay was found to be higher in patients who died (p<0.001) *(Table 3)*. When the patients were evaluated according to discharge and mortality, it was found that mortality rates were the highest in general intensive care (38.6%), which was followed by emergency intensive care (35.9%) and the department of general internal medicine (25.5%). Higher mortality rates were found in emergency and general intensive care patients than in those in the department of internal medicine [OR:7.4 (5.7-9.7), OR: 10.4 (8.2-13.3), respectively, CI: 95%, (p<0.001)].

Table 1. Demographic findings.

	Mean±SD	Min	Q1	Q2	Q3	Max
Age (year)	50.82±19.25	18	35	51	65	101
Duration of hospital stay (day)	6.59±4.21	3	4	5	8	83
	n			%		
Gender						
Female	1,487			45.8%		
Male	1,759			54.2%		
Unit						
Emergency Intensive Care	347			10.7%		
Internal Medicine Department	2,467			76.0%		
Intensive Care	432			13.3%		
Form of discharge						
Discharged at one's own accord	22			0.7%		
Death	510			15.7%		
Discharge	2,714			83.6%		

SD: standard deviation, Q1: percentile 25, Q2: percentile 50 (median), Q3: percentile 75.

Table 2. Distribution of patients' diagnoses.

Diagnosis	n	%
Chronic kidney disease	1,001	29.4%
Acute kidney injury	503	14.8%
Diabetic emergencies	406	11.9%
Anemia	178	5.2%
Gastrointestinal system diseases	143	4.2%
Respiratory system diseases	132	3.9%
Electrolyte balance disorders	125	3.7%
Hypertensive emergencies	120	3.5%
Infectious diseases	111	3.3%
Cardiovascular system diseases	103	3.0%
Malignancy palliations	77	2.3%
Viral hepatitis	72	2.1%
Hematological benign diseases	49	1.4%
Hematological malignancies	45	1.3%
Other urinary system diseases	38	1.1%
Other miscellaneous causes	38	1.1%
Inflammatory bowel diseases	26	0.8%
Tuberculosis	24	0.7%
Other endocrine system diseases	17	0.5%
Rheumatological diseases	11	0.3%
Hypervolemic conditions	7	0.2%
Gall bladder and biliary tract diseases	6	0.2%
Stevens Johnson's syndrome	6	0.2%
Disruption and malnutrition in oral intake	5	0.1%
Acid-base balance disorders	3	0.1%

Table 3. Clinical outcomes of the patients.

	Form of discharge		
	Death (n=510) Median (Q1/Q3)	Discharge (n=2,736) Median (Q1/Q3)	p value
Age (year)	50 (33/70)	51 (35/65)	0.453[u]
Hospitalization (day)	6 (4/9)	5 (4/7)	<0.001[u]
	n (%)	n (%)	
Gender			
Female	235 (46.1)	1,252 (45.8)	0.923[pe]
Male	275 (53.9)	1,484 (54.2)	
Unit			
Emergency Intensive Care	130 (25.5) [B]	217 (7.9)	<0.001[pm]
Internal Medicine Service	183 (35.9)	2,284 (83.5)[A]	
Intensive Care	197 (38.6)[B]	235 (8.6)	

[u]Mann Whitney U test (Monte Carlo), [P]Pearson Chi-Square test ([e]Exact, [m]Monte Carlo), Q1: percentile 25, Q3: percentile 75.

Discussion

In the present study, more than half of the patients hospitalized in our department were found to have acute and chronic renal failure, as well as acid-base disorders, hypervolemia, and electrolyte imbalance. Due to the socioeconomic and sociocultural conditions of the environment in which our hospital is located, patients mostly apply to the hospital after apparent renal insufficiency due to the inadequacy of the diagnosis and treatment of HT, DM and failure to eliminate diet and treatment incompatibilities. Besides, there were many patients diagnosed with AKI due to gastroenteritis, malnutrition and, urinary system obstructions [stone, benign prostate hyperplasia (BPH), and infection] (14.8%). It would also be beneficial to discuss the hospitalized patients in terms of important health problems.

Acute and Chronic Renal Failure

CKD is a public health problem with a prevalence of 11-13% worldwide.[1] The number of patients with end-stage renal disease (ESRD) continues to increase throughout the world. Besides, the presence of CKD is associated with an increase in cardiovascular mortality as well as all-cause deaths in the general population. CKD in Sub-Saharan Africa (SSA) mainly affects young adults in their economically productive years and is the leading cause of death. Factors contributing to this bleak picture include late admission to hospital, limited renal replacement therapy (RRT), limited means used by healthcare professionals in preventing kidney diseases, and inadequate awareness of kidney disease in the community. However, in developing countries where approximately 85% of the world's population lives, CKD prevention programs are limited or their capacity mot viable. In SAA countries, HT, obesity, and DM are the three most common causes of CKD.[2] HT, proteinuria, dyslipidemia, obesity, and smoking are among the changeable factors. In addition,, there is no doubt that most infectious diseases such as malaria, schistosomiasis, hepatitis C and HIV increase the risk of developing CKD.[2]

Despite advanced treatment methods and transplantation options, high mortality and morbidity rates in ESRD patients are a serious public health problem.[3] Globally, approximately three million patients are currently receiving renal replacement therapy (RRT), and this number is expected to increase by 5 to 10 million by 2030.[4]

HD, the most frequently applied replacement therapy, is the most common method used in SSA with approximately 150 dialysis units spread across 13 countries. Most of the centers are in 4 countries: Nigeria, South Africa, Sudan, and Mauritius. In other countries in the sub-region such as Somalia, there are very few facilities.[5,6] Although CKD-related morbidity and mortality rates are high in low- and middle-income countries (LMICs), accurate epidemiological data on CVD in patients with CKD are still not available in these countries.[7]

In a study by Sachetti et al.[8], hypervolemia and hyperkalemia were identified as the most common causes requiring hospitalization of patients diagnosed with CKD. Similarly, electrolyte disturbances, deteriorations in acid-base balance and hypervolemia and hyperkalemia in most patients, which required urgent HD, were detected in the present study. Proper nutrition management, follow-up of chronic diseases such as comorbid DM and HT, regular drug use, referral to a nephrologist at the appropriate time and protection of vascular access routes for HD preparation also play an important role in CKD follow-up.[9]

Diabetes and Its Complications

DM is growing at an alarming rate worldwide and is becoming one of the most burdensome chronic diseases of our time. Following a rapid change in nutrition and active life- styles in developing countries, the development rate of DM is now considered to be of pandemic proportioms.[10,11] type 2 diabetes (T2D) accounts for 90-95% of all diabetes cases. In Somalia, diets rich in carbohydrates associated with intense fruit consumption, and inadequate physical activity increase the risk of developing DM However, due to insufficient glucose tolerance or insufficient practices for the early screening of DM, patients are admitted to the hospital with obvious DM and related complications.

Although the average age of patients diagnosed with T2D in the region where Somalia is located frequently corresponds with the reproductive years, most of them can be treated with oral antidiabetic

drugs and appropriate lifestyle changes according to American Diabetes Association (ADA) and European Association for the Study of Diabetes (EASD). Guidelines.[12] At the internal medicine clinic, those that are the most difficult to manage in this region are patients diagnosed with type 1 DM and type 2 DM, who need insulin. Due to the country's economic and infrastructure problems, access to suitable medication and maintaining insulin that requires a cold chain are major problems.

Short-acting crystalline insulin and mixture insulin preparations, which are not readily available on the market in Somalia, can be used in treatment. Although these treatments are relatively cost effective, problems present in terms of ease of use, treatment success and the risks of hypoglycemia compared to new generation insulin preparations. Moreover, the low rate of social security provision among patients means that access to insulin is overall quite limited. DM is a chronic disease, whose treatment should be monitored regularly, and care should be taken in terms of possible complications. In the present study, 11.9% of the patients were found to be hospitalized in our clinic due to DM and serious related complications. This figure covers only those patients in urgent need of hospitalization and can be regarded as the tip of the iceberg.

Considering the guidance recommendations, it is almost impossible for patients who need intensive insulin therapy to participate in the treatment process. Therefore, morbidity and mortality frequently develop in type 1 DM and type 2 DM patients due to the early effects of hyperglycemia. It is important for patients to continue treatment rather than insulin treatment selection methods. Patients with this condition must receive treatment in the later stages of the disease when complications such as diabetic ketoacidosis, hyperglycemic non-ketotic coma and diabetic end-organ injuries (retinopathy, nephropathy, neuropathy etc.) appear. Moreover, in terms of providing drugs used in DM and cold chain insulin treatment, Somalian patients have a higher risk of death, especially due to cerebrovascular diseases, where the main risk factors are DM, and HT.[13]

Acute and Chronic Viral Hepatitis

Viral hepatitis is an important public health problem, especially in developing countries. Chronic hepatitis-B virus (HBV) infection is quite common, especially in Asia and Sub-Saharan Africa. Viral hepatitis, especially HBV, is an important public health problem in Somalia. Approximately 15-40% of individuals with chronic HBV infection have an important risk for the development of cirrhosis, fulminant hepatitis, and hepatocellular carcinoma (HCC).[14,15] Analyzes on the global distribution of chronic HBV infection classify regions as low (<2%), intermediate (2-7%) and high (≥8%) prevalence regions according to the prevalence of HBsAg.[16] Somalia is a country with a high rate of HBV seroprevalence globally with a value >8. Viral hepatitis complications continue their natural course, especially due to insufficient screening and vaccination programs for HBV and HAV infections.

In Somalia, the number of skilled health personnel is insufficient due to decades of civil war. Limited access to modern laboratory facilities creates significant screening and diagnostic challenges for viral hepatitis cases.[17] A study (1992) on the prevalence of serological markers for HBV and HCV in 596 children in a residential institution in Somalia reported a prevalence of 16% for HBsAg and 1.5% for anti-HCV.[15-18] In another study conducted with 62 Somalian patients with chronic liver disease, including primary HCC, prevalence rates were reported as 37.1% for HBsAg and as 40.3% for anti-HCV.[19,20] While these patients probably do not need virus suppressing medications, they will still need training on transmission, continuous monitoring for progression to cirrhosis, and HCC screening. No studies on viral hepatitis epidemiology have been reported in Somalia since 1992, and the data available on the prevalence of HBV and HCV in Somalia is notably limited. In the present study, it was found that 72 (2.1%) patients received inpatient treatment in our service for acute and chronic viral hepatitis, and 163 (4.8%) patients were frequently treated for hepatitis complications (cirrhosis, esophagus varicose and HCC). Since we do not have current seroprevalence rates in this study, we did not have a chance to make a more detailed analysis.

Hypertension and Cardiovascular Diseases

Cardiovascular diseases (CVD) continue to be the leading cause of death worldwide and are constantly increasing in prevalence.[21,22] Various changeable risk factors such as HT, DM dyslipidemia, obesity, smoking, unhealthy nutrition, and the harmful use of alcohol have an impact on the development of CVD.[23,24] Epidemiological and demographic transitions continue in LMICs such as Somalia, resulting in an increased burden in non-communicable diseases. Somaliland (formerly Northern Somalia) has a population of about 4.5 million, about 53% of whom live in urban areas.[25,26] Significant CVD risk factors in men include smoking, unhealthy nutrition, and HT, while in women, multiple unplanned pregnancies and a sedentary lifestyle are factors.[27,28]

Causes of death in Somalia are preventable diseases (maternal and infant deaths, nutritional deficiencies and infections) (64%), CVD (10%), cancer types (4%), chronic respiratory diseases (1%), diabetes (1%), other non-communicable diseases (8%), and accidents and injuries (12%). Preventable deaths constitute 24% of all mortalities.[29]

In Somalia, South Asia and India in particular, smokeless tobacco use is very common, with usage rates higher , in low-social-income groups, and those with lower levels of education.[30] Chewing khat t (the local fresh tobacco leaf type), a common habit in Somalia, is associated with various health problems associated with chronic diseases such as high blood pressure and coronary heart disease.[31,32] In the present study, 103 (3%) patients were being followed-up in our clinic due to CVD. This frequency was lower than expected and patients hospitalized in the cardiology clinic in our hospital were evaluated in relation to each other.

Pregnancy-related Complications

According to the joint estimates of the World Health Organization (WHO), the United Nations International Children's Emergency Fund (UNICEF) and the United Nations Population Fund (UNFPA), 293,000 women die every year as a result of pregnancy-related complications. The majority (99%) of all maternal deaths occur in LMICs, and more than half of these deaths occur in SSA. In LMICs the majority of maternal deaths can be prevented by timely and adequate intervention.[33]

In Somalia, a woman's life-long risk of death is estimated to increase by 5% due to pregnancy.[34] Somalia is one of the top five countries with the highest maternal mortality in the world, along with the Central African Republic, Chad, Nigeria, Sierra Leone and South Sudan.[35] In Somalia, the registration system for maternal deaths makes any possible review problematic. Therefore, it is estimated that maternal and infant mortality rates are even higher than current estimates.[34]

Pregnant women get help from people who practice traditional birthing methods instead of from experienced health personnel in a health center, and give birth at home. As a result, many preventable and treatable complications, especially postpartum bleeding, develop.[35] Hemorrhage developing during or after birth accounts for more than half (64.3%) of maternal deaths.[33,36,37] Health education programs should be implemented in order to change people's health-seeking behaviors.[38] In addition to anemia and postpartum hemorrhage-related complications in our clinic, hypertensive conditions of pregnancy were also considerable. Due to insufficient bed capacity in our hospital and in the overall region, we followed up postpartum hemorrhage patients with our obstetrician in our intensive care units.

Cancer and Palliative Care

Although infectious diseases are still one of the leading causes of death in SSA, the emergence of non-communicable diseases, especially cancer, is a major challenge for health systems. Health systems in this region are mainly for acute illness and maternal and infant health care. This fails to serve the needs of those with chronic diseases that require complex intervention maintenance throughout continued care.[39] Obstetric problems, nutrition and infectious diseases account for 69% of the mortality rate in Somalia, while cancers make up 4%.[40]

Palliative care services provide a more realistic public health approach for patients with cancer when cancer patients apply to health services with inadequate treatment options for the primary disease and most treatments for cancer improvement are beyond the reach of patients.[41]

In underdeveloped countries, such as Somalia, patients often apply in the late stages of the disease, regardless of the type of cancer, i.e. when chemotherapy, surgical treatment, or radiotherapy cannot provide additional therapeutic benefit. In many parts of SSA, access to cancer screening and basic treatment services is insufficient. However, the global cancer burden is expected to increase further due to an increasing and aging population, especially in less developed countries where approximately 82% of the world population lives.[42]

Although the importance of establishing cancer registry systems to identify etiological causes in cancer development, improve cancer biology studies and implement necessary interventions to prevent cancers is well established, unfortunately, adequate cancer registry records have not been established in many underdeveloped countries such as Somalia.[43,44] In this case, palliative care offers a realistic approach to fair, accessible, and cost-effective interventions.[42] Support therapy and palliative treatment were applied to a total of 122 (3.6%) cancer patients (solid and hematological) diagnosed in our hospital. Although new regulations in relation to cancer diagnosis and treatment approaches have been introduced in Somalia in recent years, the role of palliative treatment in these transition stages is important.

Chronic Respiratory Tract Diseases

LMICs are responsible for an estimated 12% of noncommunicable diseases caused by respiratory problems, especially asthma and COPD.[45] COPD was shown to be the third most common cause of death in the world between 1990 and 2010.[46] It is reported that approximately 90% of COPD-related deaths occur in LMICs.[47]

However, there is limited epidemiological evidence regarding the prevalence of COPD mortality and morbidity in LMICs and further studies are required. In Somalia, adverse conditions such as insufficient diagnosis of asthma and COPD due to insufficient health care and insufficient primary health care services, delayed treatment, and deficiencies in disease prevention present.[48,49] In Somalia, where access to adequate healthcare is quite difficult, even relatively simple needs such as that for nasal oxygen and antibiotherapy can often go unmet. A total of 132 (3.9%) inpatients in our hospital were treated for bacterial pneumonia and COPD-related complications.

Limitations

Since the present study was performed retrospectively in a relatively small patient population, it is difficult to evaluate patients in detail and to make a a more general assessment given the results obtained. Also, patient characteristics differ since patients of different departments that are not available in our hospital had to be hospitalized in the internal medicine service. Although some of our inpatients were diagnosed with infectious diseases and tuberculosis, it was thought that the number of these patients was lower than expected because they were mostly followed up in the department of infectious diseases. In addition, the presence of relatively higher number of patients diagnosed with CVD is related to their follow-up at the internal medicine clinic during periods when there is no cardiology specialist. The fact that the file recording system and the medications used by patients in the past could not be questioned in detail before social security institutions can be considered as another limitation of the study. With further prospective and wide-ranging studies, the relationship between hospitalization indications and mortality and morbidity could be better evaluated in this patient group.

Conclusions

It will likely be difficult for Somalia to create an adequate health service until the constantly changing socio-political climate stabilizes and the economy improves. The high frequencies of HT, DM, CKD and CVD in the region, which can be prevented or the complications of which can be reduced in the early period, has shown that there is a lot of work to be done in this regard. However, there have been some quite promising developments in recent years. The aid provided to Somalia, particularly from Turkey, but also from other countries on a regular basis, has increased over the last decade and a more comprehensive approach to strengthening health

systems under the guidance of most development agencies is evident. Mogadishu Turkish Hospital has started to accept patients since August 2014. The 205-bed hospital is in the status of a Training and Research Hospital. In other words, it is important not only for treating patients, but also for training physicians and other healthcare professionals. There is also a lodging, nursing school and mosque in the campus area. In this region, other hospitals affiliated to the United Arab Emirates and the United Nations, besides Turkey, also provide similar services. An important contribution of the Turkish hospital is that it provides the Somalian citizens in this region with the opportunity to obtain medical education and profession. This, in conjunction with efforts to create a regulatory framework for medical training and healthcare services is promising.

Conflict of interest

The authors declared that there are no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Authors' Contribution

Study Conception, Study Design, Supervision, Materials, Data Collection and/or Processing, Statistical Analysis and/or Data Interpretation, Literature Review, Manuscript Preparation, and Critical Review: OS, AMB.

References

1. Capewell S, Morrison CE, McMurray JJ. Contribution 1. Hill NR, Fatoba ST, Oke JL, Hirst JA, O'Callaghan CA, Lasserson DS, Hobbs FDR. Global Prevalence of Chronic Kidney Disease – A Systematic Review and Meta-Analysis. PLoS One. 2016;11(7):1-18. doi:10.1371/journal.pone.0158765.
2. Stanifer JW, Egger JR, Turner EL, Thielman N, Patel UD. Neighborhood clustering of non-communicable diseases: results from a community-based study in Northern Tanzania. BMC Public Health. 2016;16(1):226. doi:10.1186/s12889-016-2912-5.
3. McCullough KP, Morgenstern H, Saran R, Herman WH, Robinson BM. Projecting ESRD Incidence and Prevalence in the United States through 2030. J Am Soc Nephrol. 2019;30(1):127-35. doi:10.1681/ASN.2018050531.
4. Liyanage T, Ninomiya T, Jha V, Neal B, Patrice HM, Okpechi I, Zhao M, Lv J, Garg AX, Knight J, Rodgers A, Gallagher M, Kotwal S, Cass A, Perkovic V. Worldwide access to treatment for end-stage kidney disease: a systematic review. Lancet. 2015;385(9981):1975-82. doi:10.1016/S0140-6736(14)61601-9.
5. Ene-Iordache B, Perico N, Bikbov B, Carminati S, Remuzzi A, Perna A, Islam N, Bravo RF, Aleckovic-Halilovic M, Zou H, Zhang L, Gouda Z, Tchokhonelidze I, Abraham G, Mahdavi-Mazdeh M, Gallieni M, Codreanu I, Togtokh A, Sharma SK, Koirala P, Uprety S, Ulasi I, Remuzzi G. Chronic kidney disease and cardiovascular risk in six regions of the world (ISN-KDDC): a cross-sectional study. Lancet Glob Heal. 2016;4(5):e307-19. doi:10.1016/S2214-109X(16)00071-1.
6. Ojo A. Addressing the global burden of chronic kidney disease through clinical and translational research. Trans Am Clin Climatol Assoc. 2014;125:226-9.
7. Stanifer JW, Muiru A, Jafar TH, Patel UD. Chronic kidney disease in low- and middle-income countries. Nephrol Dial Transplant Off Publ Eur Dial Transpl Assoc - Eur Ren Assoc. 2016;31(6):868-74. doi:10.1093/ndt/gfv466
8. Sacchetti A, Stuccio N, Panebianco P, Torres M. ED hemodialysis for treatment of renal failure emergencies. Am J Emerg Med. 1999;17(3):305-7. doi:10.1016/S0735-6757(99)90131-6.
9. Lee J, Lee JP, An JN, Kim SG, Kim Y-L, Yang CW, Kang S-W, Kim N-H, Kim YS, Oh YK, Lim CS. Factors Affecting the Referral Time to Nephrologists in Patients With Chronic Kidney Disease: A Prospective Cohort Study in Korea. Medicine (Baltimore). 2016;95(19):e3648. doi:10.1097/MD.0000000000003648.
10. Gele AA, Pettersen KS, Kumar B, Torheim LE. Diabetes Risk by Length of Residence among Somali Women in Oslo Area. J Diabetes Res. 2016;2016:5423405. doi:10.1155/2016/5423405.
11. Joseph JJ, Echouffo-Tcheugui JB, Golden SH, Chen H, Jenny NS, Carnethon MR, Jacobs D, Burke GL, Vaidya D, Ouyang P, Bertoni AG. Physical activity, sedentary behaviors and the incidence of type 2 diabetes mellitus: the Multi-Ethnic Study of Atherosclerosis (MESA). BMJ Open Diabetes Res & Care. 2016;4(1):e000185. doi:10.1136/bmjdrc-2015-000185.
12. American Diabetes Association (ADA). Standard of medical care in diabetes - 2017. Diabetes Care. 2017 Jan;40(Suppl 1):S4-128. doi: 10.2337/dc17-S003.
13. Fedeli U, Ferroni E, Pigato M, Avossa F, Saugo M. Causes of mortality across different immigrant groups in Northeastern Italy. PeerJ. 2015 May 21;3:e975. doi: 10.7717/peerj.975.
14. Lok ASF, McMahon BJ. Chronic hepatitis B: Update 2009. Hepatology. 2009;50(3):661-62. doi:10.1002/hep.23190.
15. Rossi C, Shrier I, Marshall L, Cnossen S, Schwartzman K, Klein MB, Schwarzer G, Greenaway C. Seroprevalence of chronic hepatitis B virus infection and prior immunity in immigrants and refugees: a systematic review and meta-analysis. PLoS One. 2012;7(9):e44611. doi:10.1371/journal.pone.0044611.
16. Alter MJ. Epidemiology and prevention of hepatitis B. Semin Liver Dis. 2003;23(1):39-46. doi:10.1055/s-2003-37583.
17. Hassan-Kadle MA. The Diagnostic Challenges, Possible Etiologies and Lack of Researches of Hepatocellular Carcinoma in Somalia. Open J Gastroenterol. 2017;07(03):115-23. doi:10.4236/ojgas.2017.73013.
18. Bile K, Mohamud O, Aden C, Isse A, Norder H, Nilsson L, Magnius L. The risk for hepatitis A, B, and C at two institutions for children in Somalia with different socioeconomic conditions. Am J Trop Med Hyg. 1992;47(3):357-64. doi:10.4269/ajtmh.1992.47.357.

19. Bile K, Aden C, Norder H, Magnius L, Lindberg G, Nilsson L. Important role of hepatitis C virus infection as a cause of chronic liver disease in Somalia. Scand J Infect Dis. 1993;25(5):559-64. doi:10.3109/00365549309008543.
20. Hassan-Kadle MA, Osman MS, Ogurtsov PP. Epidemiology of viral hepatitis in Somalia: Systematic review and meta-analysis study. World J Gastroenterol. 2018;24(34):3927-57. doi:10.3748/wjg.v24.i34.3927.
21. Yuyun MF, Sliwa K, Kengne AP, Mocumbi AO, Bukhman G. Cardiovascular Diseases in Sub-Saharan Africa Compared to High-Income Countries: An Epidemiological Perspective. Glob Heart. 2020;15(1):15. doi:10.5334/gh.403.
22. Paolo F, Michelle C, Miller A. Cardiovascular disease and hypertension in sub-Saharan Africa : burden , risk and interventions. Intern Emerg Med. 2016;11(3):299-305. doi:10.1007/s11739-016-1423-9.
23. Mind ONMY. Tackling the Growing Burden of ardiovascular Diseases in Sub-Saharan Africa. Published online 2018:2449-51. doi:10.1161/CIRCULATIONAHA.118.037367.
24. Hamid S, Groot W, Pavlova M. Trends in cardiovascular diseases and associated risks in sub-Saharan Africa: a review of the evidence for Ghana, Nigeria, South Africa, Sudan and Tanzania. Aging Male. 2019;22(3):169-176. do i:10.1080/13685538.2019.1582621.
25. Ministry of National Planning and Development: Somaliland In Figure 2015. Published online 2015.
26. 26. Leather A, Ismail EA, Ali R, Abdi YA, Abby MH, Gulaid SA, Walhad SA, Guleid S, Ervine IM, Lowe-Lauri M, Parker M, Adams S, Datema M, Parry E. Working together to rebuild health care in post-conflict Somaliland. Lancet (London, England). 2006;368(9541):1119-25. doi:10.1016/S0140-6736(06)69047-8.
27. Peltzer K, Phaswana-Mafuya N. Fruit and vegetable intake and associated factors in older adults in South Africa. Glob Health Action. 2012;5:1-8. doi:10.3402/gha.v5i0.18668.
28. Lachat C, Otchere S, Roberfroid D, Abdulai A, Seret FMA, Milesevic J, Xuereb G, Candeias V, Kolsteren P. Diet and physical activity for the prevention of noncommunicable diseases in low- and middle-income countries: a systematic policy review. PLoS Med. 2013;10(6):e1001465. doi:10.1371/journal.pmed.1001465.
29. Organization WH. Noncommunicable Diseases Country Profiles 2018. World Health Organization; 2018.
30. Hossain MS, Kypri K, Rahman B, Arslan I, Akter S, Milton AH. Prevalence and correlates of smokeless tobacco consumption among married women in rural Bangladesh. PLoS One. 2014;9(1):e84470. doi:10.1371/journal.pone.0084470.
31. Tesfaye F, Byass P, Wall S, Berhane Y, Bonita R. Association of smoking and khat (Catha edulis Forsk) use with high blood pressure among adults in Addis Ababa, Ethiopia, 2006. Prev Chronic Dis. 2008;5(3):A89.
32. Ageely HMA. Health and socio-economic hazards associated with khat consumption. J Family Community Med. 2008;15(1):3-11.
33. Alkema L, Broaddus E, Chou D, Mathers C, Moller AB, Say L. Trends in maternal mortality 2010 - 2015, WHO. WHO Doc. Published online 2015:92.
34. Aden JA, Ahmed HJ, Östergren PO. Causes and contributing factors of maternal mortality in Bosaso District of Somalia. A retrospective study of 30 cases using a Verbal Autopsy approach. Glob Health Action. 2019;12(1). doi:10.1080/16549716.2019.1672314.
35. Pasha O, McClure EM, Saleem S, Tikmani SS, Lokangaka A, Tshefu A, Bose CL, Bauserman M, Mwenechanya M, Chomba E, Carlo WA, Garces AL, Figueroa L, Hambidge KM, Krebs NF, Goudar S, Kodkany BS, Dhaded S, Derman RJ, Patel A, Hibberd PL, Esamai F, Tenge C, Liechty EA, Moore JL, Wallace DD, Koso-Thomas M, Miodovnik M, Goldenberg RL. A prospective cause of death classification system for maternal deaths in low and middle-income countries: results from the Global Network Maternal Newborn Health Registry. BJOG. 2018;125(9):1137-43. doi:10.1111/1471-0528.15011.
36. Pacagnella RC, Cecatti JG, Parpinelli MA, Sousa MH, Haddad SM, Costa ML, Souza JP, Pattinson RC. Delays in receiving obstetric care and poor maternal outcomes: results from a national multicentre cross-sectional study. BMC Pregnancy Childbirth. 2014;14:159. doi:10.1186/1471-2393-14-159.
37. Say L, Chou D, Gemmill A, Tunçalp Ö, Moller AB, Daniels J, Gülmezoglu AM, Temmerman M, Alkema L. Global causes of maternal death: A WHO systematic analysis. Lancet Glob Heal. 2014;2(6):323-33. doi:10.1016/S2214-109X(14)70227-X.
38. Castro R, Campero L, Hernández B, Langer A. A study on maternal mortality in Mexico through a qualitative approach. J Womens Health Gend Based Med. 2000;9(6):679-690. doi:10.1089/15246090050118206.
39. Samb B, Desai N, Nishtar S, Mendis S, Bekedam H, Wright A, Hsu J, Martiniuk A, Celletti F, Patel K, Adshead F, McKee M, Evans T, Alwan A, Etienne C. Prevention and management of chronic disease: a litmus test for health-systems strengthening in low-income and middle-income countries. Lancet (London, England). 2010;376(9754):1785-97. doi:10.1016/S0140-6736(10)61353-0.
40. WHO. Global status report on noncommunicable diseases 2014. World Health. Published online 2014:176. doi:ISBN 9789241564854.
41. Kimani KN, Namukwaya E, Grant L, Murray SA. Cancer and palliative care in Africa. Eur J Cancer Care (Engl). 2017;26(1):2-5. doi:10.1111/ecc.12655.
42. World TF, Assembly H, Activity P. WHA58.22 Cancer prevention and control.:103-7.
43. Meyskens FLJ, Mukhtar H, Rock CL, Cuzick J, Kensler TW, Yang CS, Ramsey SD, Lippman SM, Alberts DS. Cancer Prevention: Obstacles, Challenges and the Road Ahead. J Natl Cancer Inst. 2016;108(2). doi:10.1093/jnci/djv309.
44. Fitzmaurice C, Abate D, Abbasi N, Abbastabar H, Abd-Allah F, Abdel-Rahman O, Abdelalim A, Abdoli A, Abdollahpour I, Abdulle ASM, Abebe ND, Abraha HN, Abu-Raddad LJ, Abualhasan A, Adedeji IA, Advani SM, Afarideh M, Afshari M, Aghaali M, Murray CJL et al. Global, Regional, and National Cancer Incidence, Mortality, Years of Life Lost, Years Lived With Disability, and Disability-Adjusted Life-Years for 29 Cancer Groups, 1990 to 2017: A Systematic Analysis for the Global Burden of Disease Study. JAMA Oncol. 2019;5(12):1749-68. doi:10.1001/jamaoncol.2019.2996.
45. Wang H, Naghavi M, Allen C, Barber RM, Bhutta ZA, Carter A, Casey DC, Charlson FJ, Chen AZ, Coates MM, Coggeshall M, Dandona L, Dicker DJ, Erskine HE, Ferrari AJ, Fitzmaurice C, Foreman K, Forouzanfar MH, Fraser MS, Murray CJL et al. Global, regional, and national life expectancy, all-cause mortality, and cause-specific mortality for 249 causes of death,1980-2015: a systematic analysis for the Global Burden of Disease Study

2015. Lancet. 2016;388(10053):1459-544. doi:10.1016/S0140-6736(16)31012-1.
46. Lozano R, Naghavi M, Foreman K, Lim S, Shibuya K, Aboyans V, Abraham J, Adair T, Aggarwal R, Ahn SY, AlMazroa MA, Alvarado M, Anderson HR, Anderson LM, Andrews KG, Atkinson C, Baddour LM, Barker-Collo S, Bartels DH, Murray CJ et al. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet. 2012;380(9859):2095-128. doi:10.1016/S0140-6736(12)61728-0.
47. Khan MA, Ahmed M, Anil S, Walley J. Strengthening the delivery of asthma and chronic obstructive pulmonary disease care at primary health-care facilities: study design of a cluster randomized controlled trial in Pakistan. Glob Health Action. 2015;8:28225. doi:10.3402/gha.v8.28225.
48. Uzaslan E, Mahboub B, Beji M, Nejjari C, Tageldin MA, Khan JA, Nafti S, Obeidat NM, Sayiner A, Wali S, Rashid N, El Hasnaoui A. The burden of chronic obstructive pulmonary disease in the Middle East and North Africa: Results of the BREATHE study. Respir Med. 2012;106:S45-59. doi:10.1016/S0954-6111(12)70014-8.
49. Jumbe Marsden E, Wa Somwe S, Chabala C, Soriano JB, Vallès CP, Anchochea J. Knowledge and perceptions of asthma in Zambia: a cross-sectional survey. BMC Pulm Med. 2016;16:33. doi:10.1186/s12890-016-0195-3.