



ISSN 2519-9781

# *Mogadishu University Journal*

*Scientific Refereed Journal*  
*Issued by Research Unit of Mogadishu University*

Issue 2, 2016

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6. Titles should be font 18, while sub-titles should be font 16
7. The research should be well-documented
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## **Editorial**

The Research Unit of Mogadishu University is pleased to issue the second annual scientific refereed journal in both English and Arabic languages to continue its scientific contributions to various fields of human knowledge, in order to contribute to solving problems, and the development of society based on scientific research.

This issue includes nine research papers; five of them are in Arabic language and four are in English. The areas that this issue covers are topics related to economy, history as well as public health, engineering, computer and information technology which reflects a true representative from most faculties of the university. Furthermore, this issue is characterized by the participation of researchers inside and outside of the university, which certainly reflects the leading side of Mogadishu University which makes this journal a platform for all researchers interested in issuing research articles on all aspects of the life of Somali society in particular and the region in general.

On this occasion, we would like to express our readiness to welcome the participation of researchers to submit their research papers to MU scientific refereed journal to be published in subsequent issues.

Finally, on behalf of the journal team, we would like to thank all those who contributed to the publishing of this issue, and we especially thank the President of Mogadishu University, Dr. Ibrahim Mohammed Mursal, and the Head of the research unit, Dr. Said Abubakar Sheikh Ahmed, for their efforts and guidance.



# ***Trend-line Analysis and Severity Assessment of Water Supply and Sanitation (WSS) of Rural and Urban Area in Somalia***

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## ***Abstract***

Due in large part to rapid urban population growth in Somalia, this growth will likely increase challenges to municipalities attempting to provide access to water supply and sanitation. This paper aims to characterize trends in access to water and sanitation in Somalia and recognize factors affecting those trends by the determination of severity score. The analyzed water supply and sanitation (WSS) coverage data from the year 1995 to 2010 was collected from Joint Monitoring Program (JMP) which is organized by renowned organizations WHO and UNICEF. From the available data can be predicted the future situation.

The urban of country was found to be increasing access in the categories of improved water supply and improved sanitation. In urban areas from 1995 to 2010, it increases from 24% to 70% of total improved water supply and reducing the amount of time spent collecting water and reducing open defecation. 80% urban people have access to the total improved sanitation. The urban area achieved the lowest severity score

than rural and total Somalia. On the contrary, in the rural area, people do not have adequate improved water supply opportunity and sanitation facility. 91% rural people are deprived of safe water where 41% of rural populations are dependent only on surface water without any treatment or purification. It is also found that 83% of rural people practice open defecation and unfortunately this rate is increasing day by day. As a result, the rural area got the maximum severity score.

Safe water access and sustainable sanitation is a burning need in Somalia. Especially the rural area is the most vulnerable study area in WSS sector. Development organizations should be concerned about the situation and it can be prescribed to raise more WASH (Water supply and Sanitation Hygienic) activities in Somalia.

**Keyword:** water, sanitation, trend line, Somalia, open defecation, rural, urban, improved, unimproved

## **Introduction**

### **1.1 Background**

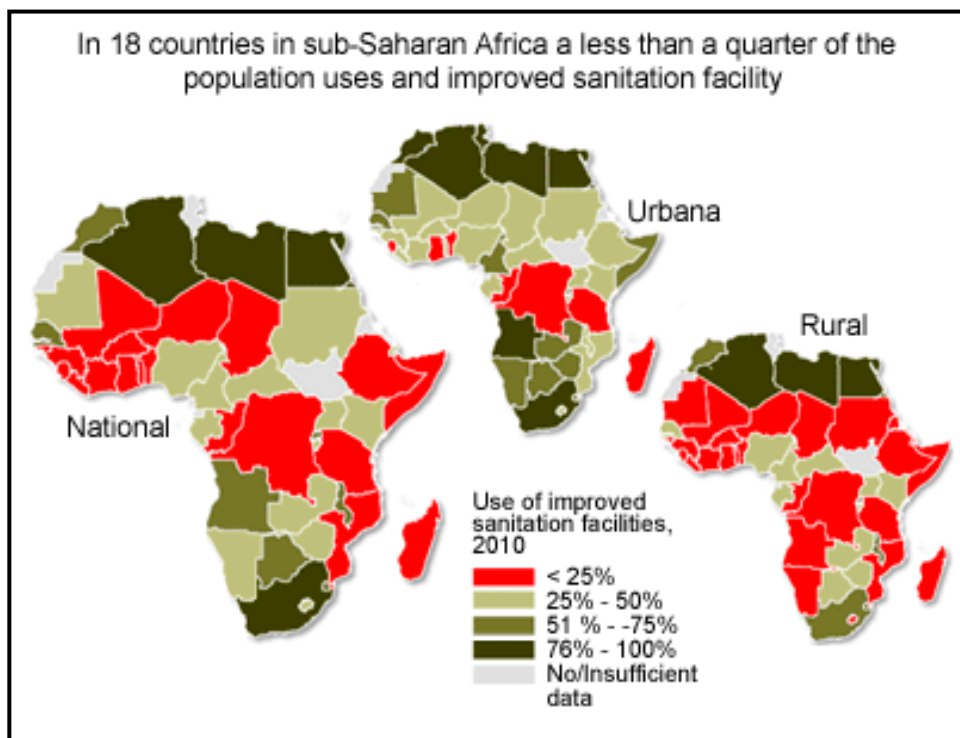
Somalia has been a largely stateless society since Siad Barre's government fall in 1991. Somalia is slowly recovering from the civil strife that has hampered the country's development for the past decade (SWALIM, 2006). Parts of the country such as Somaliland, Puntland, Galmudug, Maakhir, and Southwestern Somalia are internationally “unrecognized” autonomous regions. The remaining areas, including the capital Mogadishu, are divided into smaller territories ruled by competing warlords. Although the north of Somalia has some functioning government institutions, conflict prevails in many parts of South-Central Somalia (USAID, 2010). Accordingly, the delivery of water and sanitation services is not operated by any central government as the country is divided by local public entities. Whereas, recovery started in some urban areas influencing many Somalis to abandon their rural homes in search of better economy as well as to get rid of village conflict and natural disaster. This unpredictable placement trend of urbanization especially in pacific region, the water supply and sanitation is pulled down within the limited resource.

### **1.2 Framework of Study Area**

Only the Somaliland and Puntland region has public water supply service. This public water supply system is operated by various water companies which are invested by local businessman and stakeholders. Most of the time, they seek for funding. These water companies provide service; government authority over water planning, policy, and regulation remains virtually nonexistent. Comparatively they are doing well than village or non-water supply zone. Sanitation facilities have no existing piped sewerage systems but a high number of users. In addition,

migration from rural areas has placed added pressure on the few facilities found in peri-urban areas where migrants are settling. About 3 million liters of water are trucked in every day to the camps for internally displaced persons (IDP) to save the lives of children and their families (Adam, 2009). The impact of this is widespread, with, as an example, poor coverage of water and sanitation services, coupled with poor hygienic practice, resulting in high rates of water-related disease such as diarrhea, (including cholera), which accounts for about 20% of the county's under five mortality (UNICEF, 2011). To some extent, temporary facilities have become permanent investments. To maintain these facilities, local organizations and the humanitarian community de-sludge using vacuum tankers. However, de-sludging in this case does not avoid water table contamination because infiltration is not stopped as in a septic tank. Few latrines are equipped with septic tanks and two-thirds of these are not managed. In areas where displaced people have settled, almost no sanitation facilities exist. This forces most to resort to open defecation on the periphery of peri-urban areas and refugee camps (USAID, 2010).





**Figure 1: The Competitive Condition of Improved Sanitation in Sub-Saharan Africa**

**Source: Sohan, 2016**

Access to clean and safe water in Somalia is one of the main challenges due to a combination of factors; arid climate, chemical concentration of water sources and human-induced conflict. Moreover, existing water sources are inadequate in terms of accessibility, quality and quantity. The high concentration of chemical components and salinity in the groundwater makes it unsafe for human consumption and even with the presence of surface water it is often contaminated, therefore needing treatment (IOM, 2014) Water scarcity and increasing rainfall variation is a main problem in Somalia. Many of its regions have experienced severe droughts followed by severe flooding. Rural populations are particularly vulnerable for both of the cases as they don't have enough resource or adaptive capacity. Moreover, brutal conflicts

have erupted in localized areas as water scarcity has increased. As they do not have enough sanitation system, they practice open defecation. Different charitable organizations have had to implement major water trucking operations and other measures to deliver water to drought-affected victims. After controlling this situation, the humanitarian agencies, NGOs, and the donor community try to implement Water, Sanitation and Hygienic (WASH) through boreholes and latrine installation in rural community.

### **1.3 NGO Involvement in WSS Sector**

Donor involvement in Somalia's Water Supply and Sanitation (WSS) sector is primarily a humanitarian operation. Very little focus has been devoted to WSS financial, managerial, and technical issues. Somalia receives aid from several multilateral and bilateral sources. The United States is the largest bilateral donor while the European Union is the largest multilateral donor to Somalia. Other major donors include the World Bank, Italy, Japan, Sweden, Norway, the Netherlands, Britain and Denmark. Minor donors include Canada, Finland, Germany and Egypt. Several UN agencies, particularly the United Nations Development Program and United Nations Children's Fund, provide assistance as well. Most humanitarian operations are coordinated through UN – Somalia.

## **2. Methodology**

The whole research was done under five major parts of methodology. Data collection, simulation, analysis, assessment, finding with adaptations was the main process of the study (Figure-1).

Water and sanitation data from the year 1995 to 2010 is extracted from JMP report. JMP is Joint Monitoring Program organized by World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) which is recognized worldwide. Collected data are simulated in two major sections: water and sanitation. These parts are also divided into different segments (Table-1).

**Table 1: Data Simulation Ladder in Water and Sanitation Sector**

<i>Drinking Water Ladder</i>			
<b>Improved Water</b>		<b>Unimproved Water</b>	
<p><b>Piped water on premises:</b></p> <p>Piped household water connection located inside the user’s dwelling, plot or yard.</p>	<p><b>Other improved drinking water sources:</b></p> <p>Public taps or standpipes, tube wells or boreholes, protected dug wells, protected springs, rain water collection.</p>	<p><b>Unimproved drinking water sources:</b></p> <p>Unprotected dug well, unprotected spring, cart with small tank/ drum, tanker truck, bottled water.</p>	<p><b>Surface drinking water sources:</b></p> <p>River, dam, lake, pond, stream, canal, irrigation channels.</p>
<i>Sanitation Ladder</i>			
<b>Improved Sanitation</b>		<b>Unimproved Sanitation</b>	
<p><b>Improved sanitation facilities:</b></p> <p>are likely to ensure hygienic separation of human excreta from human contact. They include the following facilities:</p> <ul style="list-style-type: none"> <li>- Flush/pour flush to:</li> <li>- piped sewer system</li> <li>- septic tank</li> <li>- pit latrine</li> <li>- Ventilated improved pit (VIP) latrine</li> <li>- Pit latrine with slab</li> <li>- Composting toilet</li> </ul>	<p><b>Shared sanitation facilities:</b></p> <p>Sanitation facilities of an other wise acceptable type shared between two or more households. Only facilities that are not shared or not public are considered improved.</p>	<p><b>Unimproved sanitation facilities:</b></p> <p>do not ensure hygienic separation of human excreta from human contact. Unimproved facilities include pit latrine without a slab or platform, hanging latrines and bucket latrines.</p>	<p><b>Open defecation:</b></p> <p>when human faeces are disposed of in fields, forest, bushes, open bodies of water, beaches or other open spaces or disposed of with solid waste.</p>

Data is analyzed using Microsoft excel to get output as well as its representation. Trend line analysis of simulated data are verified with the coefficient of determination  $r^2$ :

$$r^2 = 1 - \frac{SS_r}{SS_t} \dots\dots\dots \text{(Equation 1)}$$

Where,  $r^2$  = coefficient of determination of straight trend line

$SS_r$  = the sum of squares of residuals of water and sanitation coverage value

$SS_t$  = The total sum of squares of water and sanitation coverage value

The straight line equation is used for trend line analysis and for the future prediction. The straight line equation is

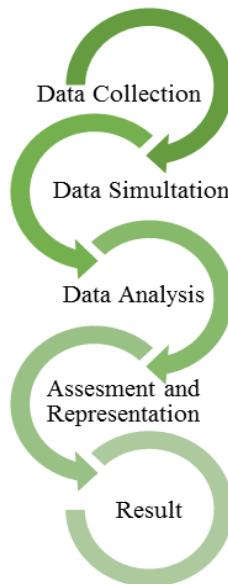
$$y = mx + c \quad \dots\dots\dots \text{(Equation 2)}$$

Where,  $y$  = Percent coverage of water/sanitation

$m$  = Gradient or slope of the trend line

$x$  = Water/sanitation coverage year

$C$  = The percent coverage of water/sanitation intercept value



**Figure 2: Process Flow Diagram of the Research Study.**

To visualize the scenario satisfactory and severity in WSS's study ingredient; the following chart is prepared in six satisfactory and severity scale.

**Table 2: Scaling of Study Ingredients**

<i>Improved System</i>					<i>Unimproved System</i>				
<b>Water Supply</b>	<b>Sanitation</b>	<b>Coverage percent</b>	<b>Scale of satisfaction</b>	<b>Severity score</b>	<b>Water Supply</b>	<b>Sanitation</b>	<b>Coverage percent</b>	<b>Scale of satisfaction</b>	<b>Severity score</b>
Piped water supply, other improve-d water source,	Improved and shared sanitation	90-100	Excellent	0	Surface water and other unimproved	Open defecation and unimproved satiation	0-10	Excellent	0
		80-90	Good	1			10-20	Good	1
		70-80	Adequate	2			20-30	Adequate	2
		50-70	Moderate	3			30-50	Moderate	3
		30-50	Poor	4			50-70	Poor	4
		0-30	Severe	5			70-100	Severe	5

The improved water supply (%) and improved sanitation (%) are scaled up by six satisfactory criteria and 6 severity criteria. The satisfactory criteria are excellent, good, adequate, moderate, poor and severe. As well as severity score is given storm 0 to 5. When satisfactory scale is “excellent” the severity score is “0” and for satisfactory scale “Severe” the severity score is “5”. Maximum severity “5” is considered the worst situation and the maximum satisfactory scale “excellent” refers to the appropriateness or adequacy of sustainable water and sanitation.

For example, when improved WSS coverage 75% the satisfactory scale is “Adequate” and severity score is “2”. If same result 75% is considered for unimproved section, the satisfactory scale is “Severe” and severity score is “5”.

This satisfactory scale and the severity score will help to judge the past, present and future condition at a glance. It will also help to compare with any country’s satisfaction as well as severity at a same platform. But there are some limitations of this scaling too. The coverage percentage is divided in six assumed criteria; 90-100 %, 80-90%, 70-80%, 50-70%, 30-50%, and 0-30% for improved. On the other hand, for unimproved WSS coverage percentage are assumed 0-10%, 10-20%, 20-30%, 30-50%, 50-70%, 70-100%.

### **3. Results and Discussion**

#### **3.1 Trend line of Water Supply Coverage in Somalia**

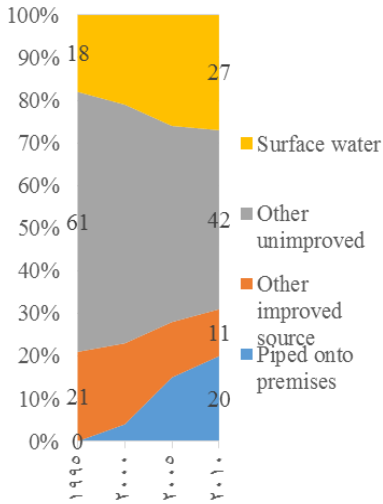
In Somalia, 42% of people are using unimproved water source and 27 percent of people are using surface water whereas only 20 percent of people have improved water source (figure 3). Other 11 percent of people use other improved water source. In the year 1995, it was almost same ration of the distribution factors.

From trend line analysis it can easily be found that, in the year 2015, there was a possibility to meet total improved water supply and unimproved water supply might meet at the same point which is almost 35 %. According to the vice versa trending, it is a matter of hope that after 2020, most of the people in Somalia will be involved using the improved water supply. In the same time it is a matter of regret that, surface water using trend line has a parallel increment with the improved water supply system. For example, in the year 1995 improved water supply was covered by 21 % of people where surface water was 18 % again, in the year 2010, gradually 31% and 27%.

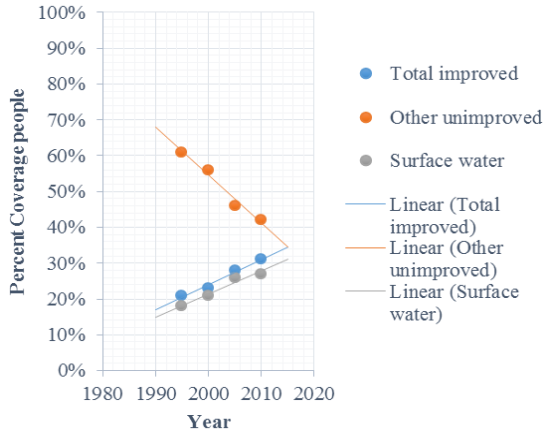
### **3.1.1 Trend of Water Supply Coverage in Urban Area**

Total improved water supply shows an increasing trend line. From 1995 to 2010 it increases 24% to 70%. From 2000-2005 the maximum increasing of improved water supply is almost 22%. Improved water supply shows vice versa result from other unimproved where the other improved water supply shows decreasing trend line (Figure 4-b). As well as the surface water use is also decreasing.

Total unimproved has a significant decreasing trend line. In the year 1995 it was 70% and in the year 2010 it decreases up to 26% (Figure 4-a). Maximum decreasing is from 2000 to 2010 and it was 21%. 2002-2004 was the most significant year both for improved and unimproved water supply. In this year total improved and other unimproved met each other for the same value 48%. At the same time improved water supply starts larger and unimproved started decreasing than improved. On the other hand, surface water use is not significantly decreasing. In 1995 it was 6% and in the year 2010 it was 4%. But less percent of surface water use is better than others.

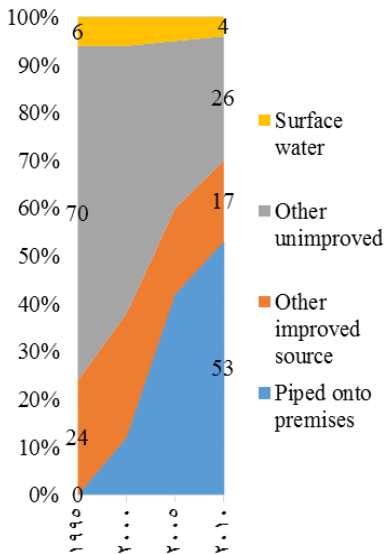


(a)

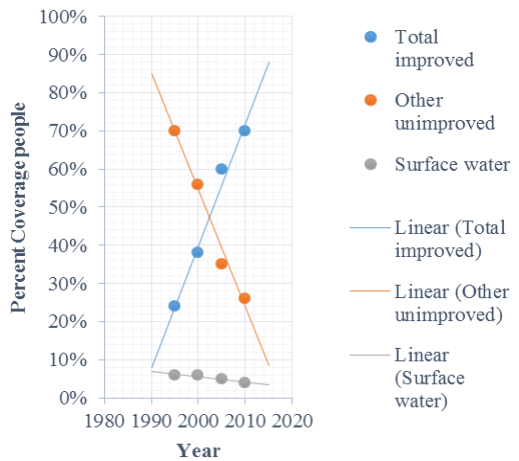


(b)

**Figure 3: Total Water Supply Coverage in Somalia over 15 years (a) in Volume and (b) Trend line Analysis**



(a)



(b)

**Figure 4: Water Supply Coverage of Rural Area in Somalia over 15 years (a) in Volume and (b) Trend line Analysis**



### **3.1.2 Trend Water Supply Coverage in Rural Area**

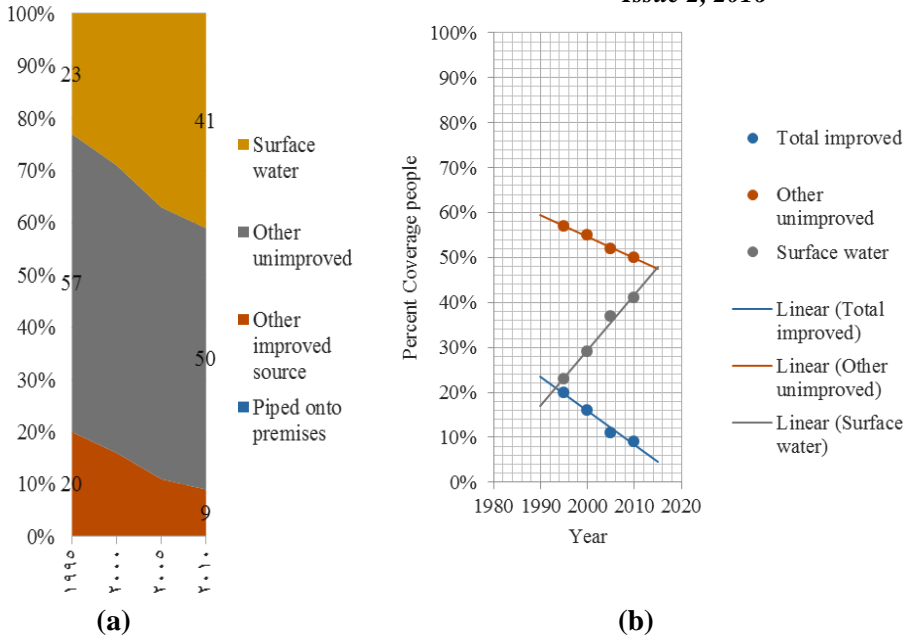
In rural area people do not have enough improved water supply opportunity. Moreover, then it is decreasing day by day.

From the year 1995 to 2010 it has decreased from 20% to 9% (Figure 5-a) . From trend line analysis (Figure 5-b), here is a chance to meet 0% of improved water supply within 2010. The other unimproved is also decreasing as parallel to the improved water supply. But use of unimproved water is significantly larger than improved and surface water. The total unimproved water used 57% in the year 1995 but in the year 2010 it was 50%. Only 7% decrease over 15 years. Surface water use is increasing day by day. It is a matter of regret that rural people take surface water without any treatment. In the year 1995 it was 23% but over the 15 years it increases 18%, so it was 41% in the year 2010. From trend line analysis, we can say, surface water and total unimproved water supply will meet together within the year 2015. After 2020 maximum people may use surface water, which can be the largest amount of people in the rural.

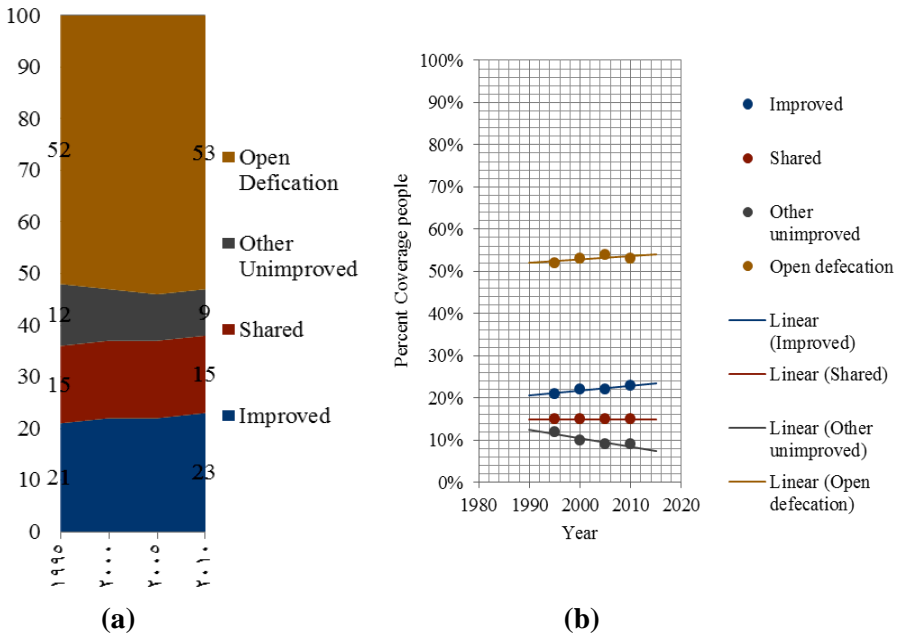
### **3.2 Trend of Sanitation Coverage in Somalia**

According to the result of 2010, most of the people in Somalia practice open defecation and it is more than 50 percent. It is a matter of regret that the improved sanitation system is only 23% which was 21% in the year 1995 so it has not changed significantly.

From trend line analysis the improved sanitation and open defecation practice is in increasing trend, other unimproved is decreasing trend and the shared latrine holds the constant liner trend. From the figure 6, it is clear that, there is no significant change over 15 years of sanitation practice in Somalia. Shared latrine is increasing in urban and decreasing in rural area so it balances. Though improved is increasing in urban area but decreasing in rural area. So, Urban area is improving day by day, whereas, the village in Somalia is going to be vulnerable.



**Figure 5: Water Supply Coverage of Rural area in Somalia over 15 years (a) in Volume and (b) Trend line Analysis**



**Figure 6: Sanitation Coverage in Somalia over 15 years (a) in Volume and (b) Trend line**

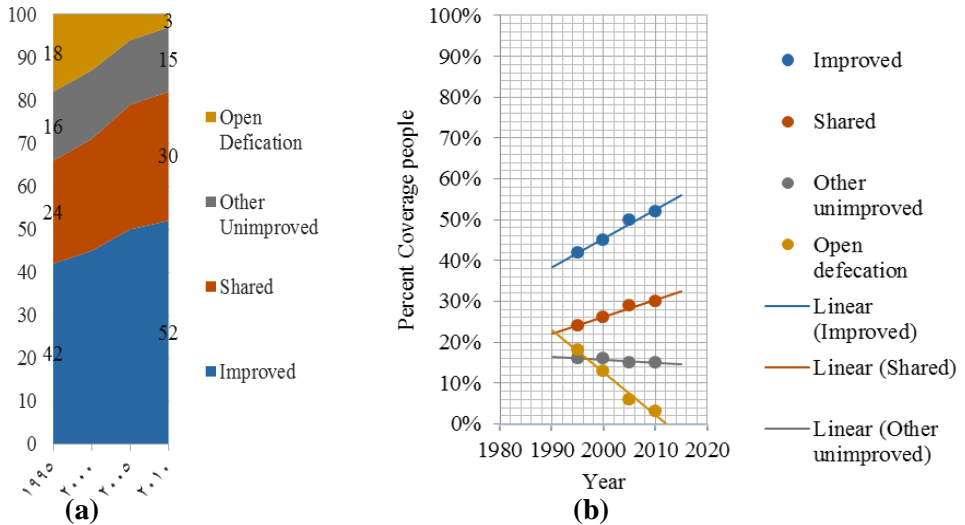
### **3.2.1 Trend of Sanitation Coverage of Urban Area in Somalia**

Improved sanitation system is increasing day by day. In the last 15 years (1995-2010) it increases 10% which is from 42% to 52%. From trend line we can find from the year 2006 more than 50% of urban people are fascinated by improved sanitation.

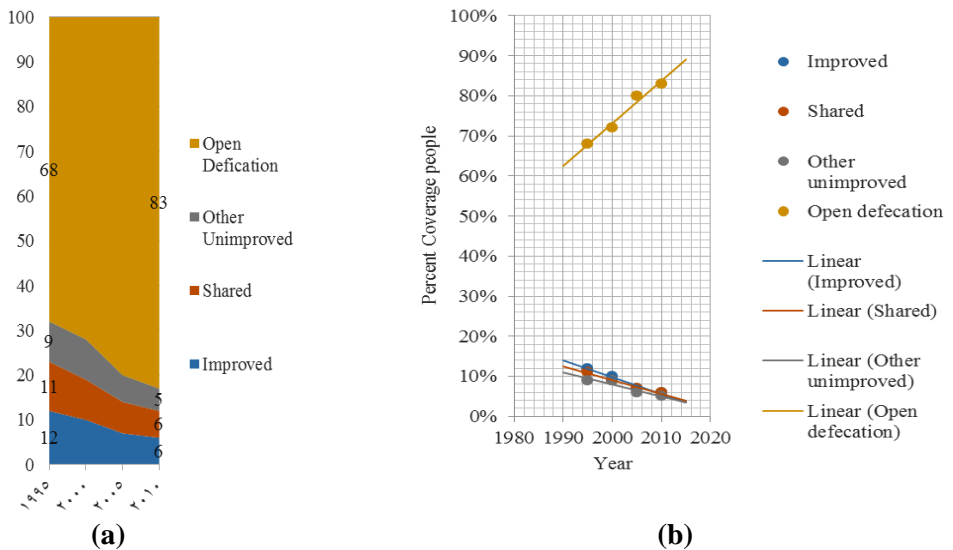
Shared latrine is also increasing year to year but the rate is slow. It increases only 6% over 15 years. Other unimproved are almost constant over 15 year's analysis. In the year 1995 it was 16% and in the year 2010 it was only 15%. Open defecation in urban is satisfactory decreasing. Over 15 years it decreases from 18% in the year 1995 to only 3% in the year 2010. From trend line it can be assumed that in the year 1991 open defecation and the use of shared latrine was in same percent and in the year 199-97 open defecation and unimproved was in the same percentage. After 1998 it crosses down from the situation. So, finally it can be said, that total improved sanitation system is developing and total unimproved sanitation system is decreasing in the urban area of Somalia. Hopefully next up gradation of data we can find no open defecation in Somali urban area.

### **3.2.2 Trend of Sanitation Coverage of Rural Area in Somalia**

In rural area the trend line of open defecation is unsatisfactory increasing. It increases 68 percent to 83%, that is, about 15% from the year 1995 to 2010. So every 5 years 5% of rural people are involving themselves in open defecation practice. This practice is very unhygienic and causes water borne diseases like diarrhea.



**Figure 7: Sanitation Coverage of Urban Area in Somalia over 15 years (a) in Volume and (b) Trend line**



**Figure 8: Sanitation Coverage of Rural Area in Somalia over 15 years (a) in Volume and (b) Trend line**

If the condition becomes constant after the 2027, all rural people may be involved with the practice of open defecation at the same time improved will be 0% which is a great threat for the environment. On the other hand, improved sanitation system, shared sanitation system and other unimproved sanitation system are decreasing in a same ratio. Gradually there conditions in the year 2010 are 6%, 6% and 5%. Shared latrine is decreasing due to internally displaced people (IDP). They are shifting to urban, so the village is not improving economically. As a result, people cannot make effort for improved sanitation and practice the unhealthy open defecation.

### **3.3 Assessment of WSS in Somalia**

#### **3.3.1 Assessment of Water Supply Coverage**

The total summary of the study of water supply with satisfactory scale and severity score is represented by Table 3. According to the satisfactory scale and severity score the total improved water supply system is “adequate” in urban and the severity score is only 2. From the year 1995 to 2010 the trend line is increasing, the severity score is decreasing while the  $r^2$  value of the trend line is 0.9816. On the other hand, surface water shows a declining trend line with the  $r^2$  value of 0.8909, the satisfactory scale is “excellent” and “severity” score is 0. The other unimproved in urban area is also declining, the satisfactory scale is “good” and severity scale is only 1.

On the other hand, the opposite situation is found in rural area. The total improved water supply is declining, the severity score is five which is maximum, the satisfactory scale is minimum which is “severe” while the  $r^2$  value is 0.9757. But, other improved and surface water coverage is “moderate”. It is a matter of attention that surface water use is increasing in rural area.

If the total Somalia is considered; the total improved, unimproved and surface water are respectively “poor”, “moderate” and “adequate” for the satisfactory scale and the severity scores are respectively 4, 3 and 2.

### 3.3.2 Assessment of Sanitation System Coverage

The significant result comes from the summary of sanitation system in Somalia by the assumed scale is representing table 4. For the open defecation, the urban area’s result is showing “excellent” satisfactory result with 0 severity value where, the satisfactory result is “severe” with the severity value 5 in rural area. Not only this score but also the trend line is saying that the condition is going to be serious in rural area. Even the rural area affects the whole Somalia’s result. The total Somalia is showing “poor” satisfactory scale with 4 severity points, the trend line is increasing. The improved system is showing “severe” satisfactory value for both improved sanitation systems, the severity score is maximum, 5.

**Table 3: Water Spply Assessment by Severity Score**

Study Area	Analyzing Category	Total Improved	Other Unimproved	Surface Water
Urban	Trending pattern	Increasing	Declining	Declining
	$r^2$	0.9816	0.9797	0.8909
	% people coverage*	70%	17%	4%
	Satisfactory Scale	Adequate	Good	Excellent
	Severity Score (0-5)	2	1	0
Rural	Trending pattern	Declining	Declining	Increasing
	$r^2$	0.9757	0.9931	0.9856
	% people coverage*	9%	50%	41%
	Satisfactory Scale	Severe	Moderate	Moderate
	Severity Score (0-5)	5	3	3
Total Somalia	Trending pattern	Increasing	Declining	Increasing
	$r^2$	0.9761	0.9727	0.9481
	% people coverage*	31 %	42%	27 %
	Satisfactory Scale	Poor	Moderate	Adequate
	Severity Score(0-5)	4	3	2

\*The “Percent people coverage” data is only for the year 2010.

**Table 4: Sanitation sStem Assessment by Severity Score**

Study Area	Analyzing Category	Improved	Shared	Other Unimproved	Open Defecation
Urban	Trending pattern	Increasing	Increasing	Declining	Decaling
	r <sup>2</sup>	0.9661	0.9692	0.8	0.9797
	% people coverage*	52 %	30 %	15 %	3 %
	Satisfactory Scale	Moderate	Poor	Good	Excellent
	Severity Score (0-5)	3	4	1	0
Rural	Trending pattern	Declining	Declining	Declining	Increasing
	r <sup>2</sup>	0.9692	0.9797	0.8824	0.9703
	% people coverage*	6 %	6 %	5 %	83 %
	Satisfactory Scale	Severe	Severe	Excellent	Severe
	Severity Score (0-5)	5	5	0	5
Total Somalia	Trending pattern	Increasing	Constant	Decreasing	Increasing
	r <sup>2</sup>	0.9	-	0.8333	0.4
	% people coverage*	23 %	15%	9%	53%
	Satisfactory Scale	Severe	Severe	Excellent	Poor
	Severity Score(0-5)	5	5	0	4

\*The “Percent people coverage” data is only for the year 2010.

Sanitation condition is comparatively better in urban area. But this result is not so good. From the table 4, improved sanitation coverage is only 52% and the other improved is only 30% whereas their satisfactory results are respectively “moderate” and “poor”. So, the severity values are also respectively 3 and 4.

This is a matter of concern that the improved sanitation facility is only “moderate” in urban area but “severe” both for rural and total Somalia. As well as the open defecation is only “excellent” in urban but in rural area it is “severe” and in the total Somalia it is “poor”. This condition is less than the target of the Millennium Development Goals (MDG).

### 3.3.3 Final Severity Score Assessment in WSS Sector

For the water supply sector,

The total score = Total Improved + Other Improved + Surface Water  
= 5 + 5 + 5 = 15.

Where, the achieved severity score in Urban is = 2+1+0 = 3 out of 15

the achieved severity score in Rural is = 5+3+3 = 11 out of 15

the achieved severity score in Somalia is = 4+3+9 = 9 out of 15

**Table 5: Severity Matrix for Water Supply System**

	Total Improved	Other Improved	Surface Water	Summation (out of 15)
Urban	2	1	0	3
Rural	5	3	3	11
Somalia	4	3	2	9
Summation (out of 15)	11	7	5	

For the sanitation sector,

The total score = Improved + Other Improved + Other unimproved + Open defecation  
= 5 + 5 + 5 + 5 = 20.



Where, the achieved severity score in Urban is =  $3+4+1+0 = 8$  out of 20

the achieved severity score in Rural is =  $5+5+0+5 = 15$  out of 20

the achieved severity score in Somalia is =  $5+5+0+4 = 14$  out of 15

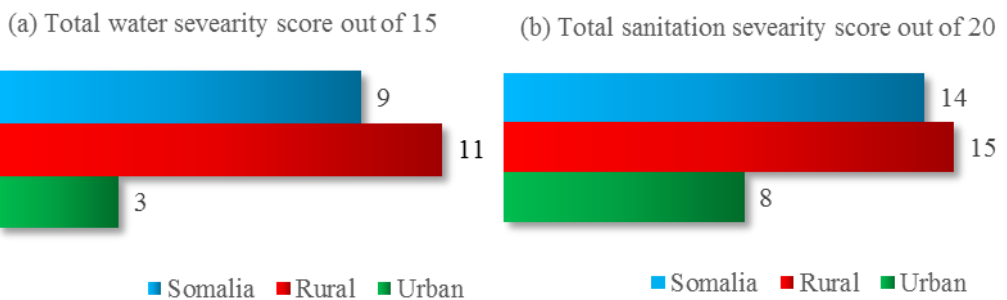
Table 5 and table 6 the severity matrix respectively express the severity score for urban, rural and total Somalia. It also can calculate the severity score for all study ingredients. The figure 9 represents the total severity scenario in all study area of Somalia.

**Table 6: Severity Matrix for Sanitation System**

	Improved	Other Improved	Other unimproved	Open defecation	Summation (out of 20)
Urban	3	4	1	0	8
Rural	5	5	0	5	15
Somalia	5	5	0	4	14
Summation (out of 15)	13	14	1	9	

For water supply system, severity score is maximum (11 out of 15) in rural area. Total improved and surface are maximum (11 out of 15). So it can be said that rural area is more vulnerable for surface water access or is no improved water supply system. Again, the sanitation system of rural area is under threat. Other improved is also most vulnerable in total study area. These two points should be focused by the development authority. The total Somalia result is influenced by rural area because the absence of improved water supply and open defecation has scored maximum (5

out of 5). It can be said that, the rural area even total Somalia is vulnerable for sustainable sanitation because they gain maximum severity score respectively 13 and 14 (out of 20). At the same time improved and other improved, in a word total improved sanitation is in worse situation as they gain the maximum severity score. Comparatively water supply system is less severe than sanitation facilities in total Somalia, but this difference is not so significant.



**Figure 9: Severity Score of WSS in Somalia**

#### 4. Conclusion and Recommendation

The urban area is developing and urban is declining day by day in WSS sector. To put in place sustainable solutions for clean drinking water for many regions in Somalia is needed. Rehabilitation of boreholes, water wells and make projects aimed for rainwater harvesting can be applied. Dams can be constructed to benefit large populations both for irrigation and livestock.

NGO, INGO, GO should come forward to improve the management of sanitation, hygienic facilities through seminars and workshops, provide adequate water treatment to minimize water borne diseases, i.e. bilharzia, diarrhea, and cholera. They can train the local community and extend water management knowledge both in harvesting, hygiene, and sanitations. They can implement water storage facilities at both

communal and household levels to raise consumption of water in the target groups.

The donors should provide guarantee of water supply in the target villages in correct quantity and quality. They can focus on basic training for all water vendors in each target village and the village sub- committee and take them through implementation steps. If they ensure sufficient water to benefit households and water, Somalia will be changed.

Supply gap assessment up to WASH cluster standards is a burning need for the researchers. Policy makers also have a great impact on this sector. So the contribution of every professional like businessman, teacher, job holder, journalists, and researchers can bring a fruitful result for the whole Somalia.

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***The Use of Social Networking Technologies among the Undergraduate Students of Mogadishu University, Mogadishu- Somalia***

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***Abstract***

There are many potential social networking sites among the undergraduate students of Mogadishu University. The objectives of this study is to identify various categories of social networking sites used by MU undergraduate, to recognize their purposes of using social networking sites, the benefits of using social networking, to identify the dangers of this social networks and final to examine the strategies for protecting the risks of using social networking sites. The study used for descriptive statistics which was employed to derive responses from a sample size of 135 undergraduate students of Mogadishu University who were selected via random sampling techniques. Data was collected from this population using questionnaire and analyzed using SPSS. The questionnaire derived from Nigeria, Nsukka made by the following scholars Charles O. Omekwu (Ph.D.), Nneka Jennifer Odoh. The results seems that majority of students are using social networking sites in interaction with friends, connecting to their class mates for discussing serious issues and watching movies. There are also benefits and threats

when using social networking sites, such threats can be prevent using the strategies available in the work.

Drawn from the findings, it was recommended that university Authorities should request to the lectures of the course introduction to computer to add some specific topics relevant social networking sites.

**Keywords:** Social Networking, Technologies, Undergraduate Students, Mogadishu University

## **Introduction**

Today's social networking sites become more popularity and have attracted billion of users, many of whom have integrated these sites into their daily practices.

New developments in the technological world have made the internet an innovative way for individuals and families to communicate. Social media networks have created a phenomenon on the internet that has gained popularity over the last decade. People use social media sites such as Facebook, Twitter, Whatsapp, IMO, Line and Viber to create and sustain relationships with others (Boyd & Ellison, 2007, p. 2).

## **Background of the Study**

The first recognizable social network site launched in 1997. SixDegrees.com allowed users to create profiles, list their Friends and, beginning in 1998, surf the Friends lists. Each of these features existed in some form before Six Degrees, of course. Profiles existed on most major dating sites and many community sites. AIM and ICQ buddy lists supported lists of Friends, although those Friends were not visible to others. Classmates.com allowed people to affiliate with their high school or college and surf the network for others who were also affiliated, but users could not create profiles or list Friends until years later. Six Degrees was the first to combine these features.

Six Degrees promoted itself as a tool to help people connect with and send messages to others. While Six Degrees attracted millions of users, it failed to become a sustainable business and, in 2000, the service closed.

From 1997 to 2001, a number of community tools began supporting various combinations of profiles and publicly articulated Friends.

Friendster launched in 2002 as a social complement to Ryze. It was designed to compete with Match.com, a profitable online dating site (Cohen, 2003, p. 7).

While most dating sites focused on introducing people to strangers with similar interests, Friendster was designed to help friends-of-friends meet, based on the assumption that friends-of-friends would make better romantic partners than would strangers (J. Abrams, personal communication, March 27, 2003, p.4). Friendster gained traction among three groups of early adopters who shaped the site—bloggers, attendees of the Burning Man arts festival, and gay men (Boyd d. , 2004).

Facebook was designed to support distinct college networks only. Facebook began in early 2004 as a Harvard-only SNS (Cassidy, 2006, p. 2). To join, a user had to have a harvard.edu email address. As Facebook began supporting other schools, those users were also required to have university email addresses associated with those institutions, a requirement that kept the site relatively closed and contributed to users' perceptions of the site as an intimate, private community.

In 2005 YouTube began and other social networking sites in 2006 Twitter were designed.

Therefore, just like radio and television, social networking has spread everywhere in Somalia and are bound to be sprouting as the new media for are still obscure. In other words, from the analysis carried out by the researcher from the world Internet statistics (2015) it was found that out of the total population of 10,616,380 Somalia, 500,000 numbers of people used Facebook as of 2015. Comparing Ethiopia and Kenya with a similar population of 99,465,819 populations (2015) and 45,925,301



populations (2015) respectively, the data shows those 3,700,000 Facebook users on Nov 15/15, 3.7% penetration rate and 5,000,000 Facebook users on Nov 15/15, 10.9% penetration rate number of people respectively used Facebook as of 2015. This result showed that Kenya with a lesser population, use Facebook more than Ethiopia. Also out of the total population, of 828,324 Djibouti, 100,000 numbers of people used Facebook as of 2015. Comparing this with the number of Somalia Facebook users, it shows that Somalia has the more number of Facebook users although this may sometimes depends upon number of population. Similarly, Florunso, etal (2010) reviewed that:

In Africa, social media networking sites are becoming widely spread than it has ever been before and it appears that people's Perception of this technology is diverse.

Furthermore, as a novel phenomenon, it is necessary to examine how Mogadishu University students use the new means of communication. This is because student's contribution as youths can make or transform any nation. (Essoungou, 2011, p. 2), explain that the new communication technology is one of few ways that young Africans can bypass the inefficiencies in the system that allow the status quo to hold on. It lowers the barriers to entry for everyone to get involved and be heard. A study like this shall help to ascertain whether Students use of the media could be regulated or not. This is obviously because the disposition of people of a given community could shape the media in existence there, just like a cerebral media scholar, (Anim, 2007, p. 2) aptly notes that societies greatly influence the operations and functions of the media that operate within those societies. "The manner in which the social media were used and the role they play in the recent uprising which rocked the middle-East popularly referred to as "Arab Spring" could be deciphered as credence to the above academic observations.

## **Problem Statement**

Of late, there has been strongly apparent interest in use of Social Networking Sites among university students and the emphasis on developing 21st century competencies.

Since social networking sites become more popularity and reached billions of users, this growth popularity of social networking sites have generated concerns among university authorities' communication experts. It has benefit and potential risks facing undergraduates.

Today there is a little or no research has been carried out in developing countries notably in Somalia and it remains unknown whether social networking sites can establish feelings of loneliness and increase feelings of insensitivity to disconnection, according to John J. Cacioppo, a neuroscientist at the University of Chicago (Cacioppo, 2009, p. 5). Hence, there is the need to fashion out some means of selecting and using the right social networking site responsibly. This study is concerned with the trend of use of the sites, what benefits students derive from using the sites, the dangers associated with them and ways to avert such dangers.

## **Research Questions**

In view of the lack of sufficient research in this area of study, so the study finds out the following five questions.

1. What are the different categories of social networking sites
2. What are the main purposes for using social networking sites?
3. What are the benefits of using social networking sites?
4. What are the dangers associated with social networking?
5. What are the strategies of protecting the threats of social networking?

## **Research Objectives**

The objectives of the study were to separate the Social Networking Technologies (SNTs) being used by undergraduate students in Mogadishu university, examine the various categories of social networking sites, determine the purpose of the usage of social networking sites by MUundergraduates, examine benefits of using social networking sites, identify the dangers associated with social network sites and To proffer strategies of ameliorating the dangers of social networking

## **Scope of The Study**

Content scope: this study is limited to the use of networking sites by undergraduate

Students of Mogadishu University, Mogadishu.

Geographical scope: it covers the extent of the use of social networking sites by theundergraduate students of Mogadishu university in Mogadishu-Somalia, categories of social networking sites, benefits of using social networking sites, purposes of using social networking sites and dangersinvolved in the use of social networking sites.

## **Literature Review**

In this section, the researcher outlines the previous studies related to the research questions as the follows:

## **Various Categories of Social Networking Sites**

There are various types of the social networking sites such as, Facebook, Twitter, Youtube, Google+, IMO, Viber, Line, Myspace, WhatsApp, LinkedIn, blogs, wikis and etc. most of these SNSs are common used for communicating, advertising and educational purposes.

According to (Chris, 2010, p. 7).Some social networking websites such as Facebook, fall in the“general, category, they accommodate folks of all interest andbackgrounds on this type of social networking websites. Memberscan after include their interest... and then locate members withsimilar interests by searching for key words and key phrases. Themain purpose of general social networking websites is to serve asa special platform where people can reunite with old friends; stayconnected with current ones, and even make new acquaintances.

Social networking sites can also be classified based on people’s areas of interest. (Harson, 2009, p. 8) Stresses that: other social networking websites have tight, niche focuses, and cater for specific groups of people. Social networking websites can revolve around sports, dating, culture, hobbies, ethnicity, education, romance, entrepreneurship and more.

### **Purposes of Using Social Networking Sites**

The popularity of social networks grows rapidly by the second. These social sites havebecome effective (to an extent) means of communicating ideas and feelings among their users.

Thus, they are beginning to get more attention from educational institutions. (Gardner, 2009, p. 6)opined that institutions are taking drastic steps to educate students on the use of the sites, especially in the areas of the privacy, legal issue and potential socio-economic and psychological dangers.

In addition, social networking enhances a student’s sense of community, sharing and collaboration brings an additional responsibility and workload, which some students find inflexible and rather “forced” (Minocha, 2009, p.6).

According to the above two references we can find out the main purpose of the SNSs such as enhancing sense of commuting, sharing and collaboration, and making inflexible rather force.

### **Benefits of Using Social Networking Sites**

Social networking sites can be a great way to make connections with people with related interests and goals, like a virtual meeting place where friends hang out. There is evidence of abroad range of benefits to student or users associated with the use of Social networking sites. These are just some of the several positive things that have contributed to social networking popularity among scholars because they can discuss different topics, share information and exchange files and pictures. However, from the study carried out by Konetes and McsKeague(2011) came up with certain revelations about the uses of the social networking sites especially, Facebook, The research reported that, “students are using Facebook and other channels to develop their identities, beliefs and stances on various issues such as politics, religion, and work, as well as to pioneer and develop intimate relationships.”

### **Dangers That Associated in Using Social Networking Sites**

Since the above benefits of social networking sites also they have caused some problems for their users, individuals, families, groups and students. Most of their users, these days, prefer to communicate via the sites rather via face-to-face contact or oral communication, thus, making social network their preferred socializing forces.

(Ahmed, 2011, p. 10)reported that one of the dangers of social networks ; cyber or E-crime encourages copyright infringement which has always remain a serious case in dealing with social Networking sites especially about the video clips for instance in the YouTube. Users without considering the terms can easily upload download or watch any

kind of video clip. YouTube for instance was sued several times on these issues. For example Viacom sued YouTube claiming one billion dollar for uploading 160 thousand videos belonging to Viacom without their permission as did the French independent labels collecting society.

Another drawback to social networking is that some users simply share too much information; people can lose their jobs or a friendship over leaking information on social networking. Even if a user of a social site has her privacy settings of highest level, their information can still be passed on by someone on their friends list. It doesn't take much for an angry follower to copy and paste a status or download a picture if they are looking for revenge.

On the following note there are a number of scammers on social networks who may try to steal your personal information; information that can be used for potential crime such as identity theft or fraud.

Furthermore, there has been a recent spike in phishing attacks associate with social media sites Fisher (2011). Many people view social media sites on cell phones or other mobile devices. This makes it harder to distinguish real and fake web sites. Additionally, social media enables attackers to send phishing messages that appear to come from someone that the victim knows.

## **Research Method**

The research design for this study is the descriptive survey research design. A descriptive survey seeks to find out certain facts concerning an existing phenomenon. According to (Aina, 2006)descriptive survey is a study which uses the sample data in any systematic investigation to describe and explains what is existent or non-existence on the present status of a phenomenon being investigated. This method is used because the study intends to elicit the opinions of the respondents on use of social

networking sites among undergraduates' students of Mogadishu University, Mogadishu.

The area of the study is Mogadishu University. The choice of the area was for proximity and to ensure effective distribution and collection of data through the use of a questionnaire. The population of this study comprises the entire undergraduate Students of Mogadishu University.

The instrument for data collection was a self-constructed questionnaire. It was titled the use of social networking sites among undergraduate students of Mogadishu University Mogadishu. The questionnaire consist of two broad parts; Part A and part B. part A is on background and characteristics of the respondents while part B was divided into six (6) clusters. Cluster 1 contain various networking sites used by the respondent with sixteen items while cluster 2 deals with the extents of used of social networking sites by the respondents with sixteen items. Cluster 3 is all about the level of agreement as to the purpose of using social networking sites with eleven items while cluster 4 is on level of agreement as to benefits of social networking sites with seven items. Cluster 5 is the dangers encountered in using social networking sites with nine items.

The questionnaire was homogeneously keyed in a 4-poing scale and the subjects were guided to respond to each item thus: SA-Strongly Agree; A-Agree; SD-Strongly Disagree; D-Disagree.

One hundred and thirty five copies of questionnaire were distributed to the respondent (undergraduate student of MU) by the researcher and collected by the researcher to ensure an accurate return rate.

## Results

In this part deals with the analysis of data collected from the field. They are presented according to the research questions, and the responses were organized using rank weighted means and simple percentage frequencies.

Research question one: what are the various categories of social network sites and there uses?

**Table 1: The Mean Responses on the Various Categories of Social Network Sites Used.**

No	Items	SA	A	N	D	SD
1	Facebook	127	8	0	0	0
2	WhatsApp	13	95	0	0	27
3	Google+	20	0	5	110	110
4	Twitter	0	57	0	74	4
5	Viber	0	56	0	0	73
6	Skype	1	0	6	4	124

From table 1, majority of the respondents answered that they use the items such Facebook, WhatsApp, Twitter, Viber and also they indicate the use IMO and Youtube sometime as learning tool. The above table indicates 127(135) of respondents are strongly agreed that they use Facebook, so Facebook the first social network that the students use. Skype was reject that is not used by the undergraduate students of Mogadishu University.

Research Questions Two: What are the purposes for using social networking sites?



**Table 2: Mean Responses on their Purposes of Using sSocial Networking Sites.**

No	Items	SA	A	N	D	SD
1	I Use social networking sites for communicating and interacting with friends.	126	0	8	1	0
2	I Use social networking sites for online learning.	0	13	3	117	2
3	I Use social networking sites for finding friends online.	0	4	1	3	127
4	I Use social networking sites for leisure and personal socialization.	0	21	5	47	62
5	I use social networking sites for professional activities (searching for job).	7	3	5	119	1
6	I use social networking sites for academic purposes such as group discussion and getting study partners online.	2	126	1	3	3
7	I use social networking sites for watching movies.	1	8	2	123	1
8	I use social networking sites for connecting and interacting with business partners.	1	23	2	1	108
9	I use social networking sites for communicating, mobilizing and organizing national issues like politics, economy and religious matters	1	7	5	0	122
10	I use social networking sites for private messaging, uploading photos and online profiles.	119	10	2	3	1
11	I use social networking sites for updating profile information's.	15	25	12	76	7

From table 2, the decision shows that 126(135) of respondents answered the most the purposes for using social networking sites is for communicating and interacting with friends, second for private messaging, uploading photos and online profiles were 119(135) answered are strongly agreed and third for academic purpose and group discussion and getting study partners.

Research Question Three: What are the benefits of using social networking sites?

**Table 3: Mean Responses on the Benefits of Using Social Networking Sites**

No	Items	SA	A	N	D	SD
1	It encourages virtual meeting with co-research scholars	2	127	1	2	3
2	It increases self-esteem and well-being.	1	95	33	5	1
3	It helps in research and learning.	0	24	100	11	0
4	It support collaborative and peer to-peer learning.	5	65	55	7	2
5	It helps in strengthening interpersonal relationships.	2	2	25	105	1
6	It promote read and write web skills.	0	19	48	64	4
7	It helps in developing an e-portfolio for future employment	1	8	18	86	22

From table 3, indicates that most of the items are accepted. The accepted benefits of using social networking sites are virtual meeting were 127(135) accepted and it increases self-esteem and well-being 95(135) are accepted. That all the items were accepted as the benefit of using social networking sites.

Research Question Four: What are the dangers associated with social networking sites?

**Table 4: Responses on the Dangers Associated with Social Networking Sites.**

No	Items	SA	A	N	D	SD
1	Lack of privacy	6	107	21	1	0
2	Laziness	0	44	38	49	4
3	Waster times	83	42	7	0	3
4	E-crime, identity theft valuable data, interruption of business, financial loss	0	96	36	3	0
5	Pornography	1	64	0	65	2

Table 4 shows that all the items were accepted that there is severity attacks associated with social networking sites. Were lack of privacy 107(135) area agreed and e-crime 96(135).

Research Question Five: What are the strategies for ameliorating the dangers of social?

**Table 5: Responses on the Strategies for Ameliorating the Dangers of Social Networking Sites**

No	Items	SA	A	N	D	SD
1	By not storing information you want to protect on any device that connect to Internet.	0	1	126	2	3
2	By being careful on the kind of information you share about yourself, family and friends	120	8	1	3	0
3	By changing your passwords periodically and not reuse old passwords.	5	1	14	0	112
4	By not posting anything that might embarrass you later, or that you don't want a stranger to know.	128	1	0	3	0
5	By not sharing your username, passwords, social security numbers, credit cards, bank information's, salaries with friends	0	96	33	2	1
6	By being thoughtful and limiting personal information you share	84	5	40	2	1

Table 5 equally shows that all items were accepted as to the strategies for preventing the severity of social networking sites. A respondent specified the following strategies.

1. To take care of kind of people to be your strangers were 120(135) are strongly agree.
2. To look for what kind of information to be stored and share with others were 126(135) are selected neutral, this shows students want to share their information with their friends.

3. Not posting anything that might worried you later, or that you don't want a friend to know were 128(135) are strongly agree
4. Most of the respondents they don't like to change their passwords periodically were 112(135) are strongly disagree because the main reason students are suffering for memorization of the password they mentioned its complex.

## **Discussion of Findings**

In this section, the researcher was discussed the findings in line with the research questions and literature review.

The mean response score representing the rate of agreement in the questionnaire reveal that the Categories of social networking site used by undergraduate student of Mogadishu university, Somalia include Facebook, Whatsapp, IMO, Twitter, Viber, and IMO. The study carried out by Chris (2010, p.6) revealed that some social networking sites such as Facebook, fall in the "general" categories, they accommodate folks of all interest and backgrounds. On this type of Social Networking Websites, members can often include their interest and they Locate members with similar interests by searching for key words and key phrases. The study further revealed that the main purposes of general social networking websites is to serve as a social platform where people can reunite with old friends; stay connected with current ones and even make new acquaintances.

Purposes for using social networking sites by MU undergraduate students. Respondents responded positively on purpose of using social networking sites. The findings of this study show that MU undergraduate students use social networking sites for different purposes. The investigation related that MU undergraduate students use the social networking sites to communicate with friends, for discussing national issues like politics, economy and religious matters, and for academic

purposes. With the respect of respondents they didn't use social networking sites watching movies because low of internet speed and high cost.

This means that the social networking sites are platforms for the students to discuss and share ideas and information on national matters, thereby educate themselves on such issues.

The respondents indicated the main benefits of getting when using social networking site: it encourages virtual meeting with co-research scholar; self-esteem and well-being; Research and learning; strengthening interpersonal relationship; read and write web skills etc. In this study with respect to research question four, it was revealed that one of the benefits of using social networking sites is that it helps in research and learning. This is in line with the view of Brennan(2001, p.8)and Notley(2010, p.8) that 'social network help in the school and universities to leverage and complement formal education learning outcomes. The researchers reported that "students are using Facebook and other sites to develop their identities, beliefs and stances on various issues such as politics, religious and work, as well as to pioneer and develop intimate relationship. "Also citing part of the results carried out by Greenhow, Robelia and Hughes,(2009, p.10); Konetes and MC Keagu(2011, p.10) that 'self-esteem, personal validation and value are positively affected by the use of Facebook for many uses especially those who have a low self-worth.

Dangers associated with social networking sites. On the dangers associated with social networking sites and from the responses gathers from questionnaire, E-crime, Internet addiction, laziness, standard crime like, fraud, murder, kidnapping; Immoral act like, pornography, prostitution, cyber-bullying where identified. In line with the research question five, the findings revealed that one of the Dangers of social

networking sites includes cybercrime. Ahmed(2011, p.10) reported that one of the cybercrimes perpetrated through the social networking is copyright infringement. According to Almed, copyright infringement also remains a serious case in dealing with social Networking sites (SNSs) especially about the video clips for instance in the YouTube. Users without considering the terms can easily upload, download or watch any kind of video clip. YouTube for instance was used several times on these issues. For example Viacom used YouTube claiming one billion dollar for uploading 160 thousand videos belonging to Viacom without their permission as did the French independent labels collecting society(SPPF) in 2009 over disputed 100 music clips. Claiming to be originally theirs but uploaded onto YouTube.

In line with this research question it was revealed that one of the strategies which were proffered to ameliorate the dangers of social networking is by not publish any kind of information that might worried you later or you don't want to know your friends. Just like what Timm &Perez(2010, p.12) reviewed, "in order to avoid disclosing information to an imposter, users should follow some prudent practices when communicating on social networking sites. Primarily, users should exercise basic caution when communicating and sharing information with online friends.

## **Conclusions and Recommendation**

The heart of the research is the use of social networking sites in Mogadishu University. It looked at the social networking sites which are being used, the extent the purpose of using social networking sites, the benefits of using social networking sites, the threats associated with social networking sites and strategies for protecting the dangers of social network sites. The study followed a descriptive research design wherein a questionnaire was used as the main research tool. Data was gathered

from 135 Mogadishu university students from different faculties. The collected data was analyzed using SPSS. An analysis of the results seems to suggest that the most popular social networking sites in Mogadishu university are Facebook, WhatsApp, IMO, Line, Viber and Twitter in that order. Further, it was also concluded that students used social networking technologies for communicating purposes and they mainly used them to conduct group work. It was also concluded that the most pronounced benefits of social networking sites include that social networking sites virtual meeting, self-esteem and well-being. The main dangers when using social networking sites they meet is lack of privacy and waste of time. Lastly, it was found out that students accepted all migrating methods to secure their account special by being careful on the kind of information you share about yourself, family and friends, by not posting anything that might embarrass you later, or that you don't want a stranger to know.

### **Recommendation to University Authorities.**

1. Although most offaculties learning course named Introduction to computer, so the researcher recommend to add atopics related to social networking sites and its risks of the students. Such topics would be helpful here.
2. It is also recommended to take center stage in promoting the use of social networking sites in education.

### **Recommendation to Students**

Since most of students are heavy users social networking sites at the night when there are at home or internet coffee, so this will led to sleep in the class, so the researcher proposes to avoid addiction and create a balance between their offline and online lives while using the sites.

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***Barriers to the Use of ICT in Education: Case Study of  
Mogadishu Secondary Schools, Somalia***

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***Abstract***

The purpose of this research is to explore the barriers encountered when introducing ICT in education in Mogadishu Secondary schools. The research assessed the influence of National/school education ICT policy and strategy; infrastructure availability, use and ease of access; and future support that teachers find useful. The paper has also reviewed a number of studies from different parts of the world and paid greater attention to those barriers existing within some of the developing countries.

The study adopted a survey research design. The sampling unit was 7 randomly selected schools from Mogadishu Secondary Schools. From each school fifteen teachers were selected for the questionnaire using random sampling technique. This made a total of 105 subjects as a whole. The data collection instruments used was an adopted questionnaires used by Department of Education and Training of Western Australia (WA).

Data generated was analyzed and presented in tables and/or figures. The findings of the study have shown lack of government ICT policy and strategy and the response of many teachers also indicated that the educational system currently having resource level problems such as lack of adequate computers and other ICTs tools, poor internet connectivity, etc.

This study concludes that the introduction of ICTs in education in Mogadishu schools is between emerging and applying stages and it is important to take measures to overcome the identified barriers in order to pass to the next stages and towards reaching the top most. Finally the paper suggested recommendations to the concerned stakeholders.

**Keywords:** ICT, Barriers, infrastructure, availability, Mogadishu, Somalia

## **Introduction**

Information technology (IT) is the application of computers and telecommunications equipment to store, retrieve, transmit, and manipulate data (Daintith, 2009). A research made by Tedla (2012, p.199) concluded that ICT is crucial for anytime and anyplace learning to ensure economic growth. There is substantial evidence that Information and Communication Technology promote quality education and effective teaching- learning atmosphere for both student and teacher.

Over the past decade in various parts of the world, information and communications technology (ICT) has become an important aspect of education at all levels from primary schools to universities. Many secondary and even elementary schools today have a computer (or ICT) teacher, and in increasing number of elementary schools (UNESCO, 2005, p. 190). Review of a research made by Tedla (2012, p.200) revealed that the countries in the study (East Africa) have played a critical role to incorporate and progress ICT into schools as part of their curricula with the exception of Somalia.

For any nation to boast of educational development, it should be able to boast of a viable and functional information and communication technology driven education in secondary schools (Osakwe, 2012, p.188). Therefore this paper examined the barriers to the use of ICTs in education in Mogadishu secondary schools and answered questions of:

- How does the Somali ICT policy framework support ICTs integration in secondary Schools in Somalia?
- To what extent are the necessary infrastructures for ICT (computers, internet) available in secondary schools?
- What types of support teachers' would find useful to assist them to further develop their ICT knowledge and skills and apply them in the classroom.

This paper provides background information to the use of computers in Mogadishu Secondary schools, with a discussion of the findings of current international research on the barriers of ICT use in education, and compares them to those existing in Mogadishu Secondary schools. It provides suggestions and recommendations to the organizational and political leadership about ways to introduce information and communication technologies (ICT) into education.

## **Literature Review**

The paper has reviewed a number of studies related to the use of ICT in education from different parts of the world and paid greater attention to those barriers existing within some of the developing countries to compare them with those existing in Somalia.

### **2.1 ICT in Schools**

Secondary schools with good ICT resources that use them well achieve better results than those schools with similar resources that are used less effectively (Becta, 2003, p.16). Therefore the use of ICT in education particularly in Secondary Schools is very important for providing opportunities for both the teachers as well as students as it improves the teaching and learning process. Studying the factors affecting use of ICT in education may help policy makers and administrators in education to improve quality of teaching and learning. Bowes (2011, p. 2) argued that when using ICT in the classroom, teachers need to explicitly plan with student learning outcomes in mind.

Somalia gained its independence in 1960 following the merger of the British Protectorate and the Italian Trusteeship Territory of Somaliland, and thirty years later the country was plagued by a civil war. This war had ceased, but the education system had disintegrated beyond repair (Hare, 2007, p. 2).

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During the period of the former government (1960-1991) most schools in Somalia were publicly owned and funded. Education was free, compulsory and accessible to all especially in urban areas. For instance, in Mogadishu, the capital of the country alone, there were 92 Schools, 54 primary schools, 25 Secondary Schools, 4 vocational and technical institutes and 9 kindergarten schools all run by the central government through the Ministry of Education (MoE, 2011, p. 7).

## **2.2 Benefits to the Use of ICT in Schools**

There are a lot of benefits to the use of ICT in schools. Tedla (2012, p. 204-205) deduced in his study on six (6) East African countries, that the benefits of ICT include:

- ✓ Generating of information and ideas;
- ✓ Fast information processing, analyzing and problem solving;
- ✓ High student management;
- ✓ Increased teacher and student motivation;
- ✓ Enhanced subject matter mastery by teachers.

### **Other benefits include:**

- ✓ High student interaction with the content;
- ✓ Enhanced confidence and high self-esteem;
- ✓ Self-directed and independent learning;
- ✓ High quality output;
- ✓ Reduced teaching load;
- ✓ Accommodation of new technologies with the existing ICT materials;
- ✓ Integration of content into projects;
- ✓ Easy teacher, student and content evaluation;
- ✓ Easier communication across units and better; and
- ✓ Collaboration among stakeholders.

Likewise Osakwe (2012, p.389) mentioned in his paper, on Nigerian public secondary schools, the role of ICT in secondary schools as the following:

- Information and communication technology helps to promote fundamental changes in teaching and learning methods; thereby helping to overcome the barriers of time and place as technology introduces new choices and opportunities for students and teachers through endless research and learning on the internet.
- ICT provides secondary school students with practical and functional knowledge of the computer, the internet and other associated gadgets that will have positive effect on future experience and make them more competent, rational and comfortable in this era of globalization.
- ICT helps students to react intelligently to future changes, expand information and live successfully in a changing world.
- ICT, through its multimedia facet, creates room for students to acquire new knowledge, fosters enquiry and exploration of facets, and adopt new approaches to teaching and learning.
- This conventional system helps to accelerate the learning process, increase teachers efficiency and effectiveness and provides remedial instruction and enrichment of material, thus guaranteeing higher quality standards in secondary schools.
- ICT facilitates students' acquisition of skills and potentials for active participation in the teaching/learning process and it also helps to enrich the curriculum by replacing the existing face-to-face instruction.
- ICT as a tool for learning enables secondary school students to efficiently and effectively access digital information for the purpose of investigating issues and solving problems.



There is a clear and positive relationship between good ICT learning opportunities and higher pupil achievement in secondary education (Becta 2003, p.8)

Khan, Hasan & Clementm (2012, p. 61) mention that although ICT has the potential to improve the educational system to a great extent, developing countries are far from reaping these benefits because of certain barriers. It was stated by research made by UNESCO Institute for Information Technologies in Education (2004, p.11) that though Secondary Education traditionally orients toward strict curricular content specifications and national final examinations, there is an ongoing trend to invest in students' capacity to learn independently and authentically. This trend needs ICTs as infrastructure and cognitive support tools.

So, as Somalia is one of the developing countries, it is important to evaluate the existence of factors hindering the introduction of ICT into its education, especially in the secondary schools.

### **2.3 Factors Affecting Integration of ICT in Education in Schools**

We have seen the role and importance of ICT in education but there are many obstacles that prevent or reduce the perfect utilization of information and communication technologies as they are supposed to be. These barriers affect the use of ICT on different levels of the different countries due to existence of the causing factors.

Tedla, 2012, p. 199, found that the inhibiting factors include unrealistic policies of ICT, poor infrastructure, lack of teacher competence, confidence, incentive, perception and beliefs, imposed curriculum, lack of proper network, political instability, brain drain, and sporadic electricity. He also found that poor transportation, lack of public awareness and participation, poor school leadership, technological illiteracy and lack of pedagogical skills also contribute to the inhibiting factors.

Aduwa-Ogiegbaen and Iyamu (2005 p. 108) reveal mostly the same in their study. They stated that there are several impediments to the successful use of information and communication technology in secondary schools in Nigeria. These are: cost, weak infrastructure, lack of skills, lack of relevant software and limited access to the Internet. Osakwa (2012) found similar challenges facing ICT development in Nigerian secondary schools, including inadequate funding, lack of qualified personnel, lack of basic infrastructural resources, and poor policy formulation and implementation.

Pupil achievement is higher where ICT learning opportunities are good or better, supported by good ICT resources. Of course, the presence of ICT resources in a school does not automatically have an impact on achievement. The key factor is whether ICT is used effectively in teaching and learning, and in particular whether pupils have good quality opportunities to learn with ICT (Becta, 2003, p.21)

In addition, obstacles such as access to equipment, time pressures, lack of mentors, and opportunities for apprenticeship of observation also have an impact on teachers' ability to use ICT (Slaouti & Barton, 2007 in Lau & Sim, 2008, p. 20). While there are several studies about how ICT is being used in developed countries, there is not much information on how ICT is being integrated into schools in developing countries.

#### **2.4 Stages of ICT Usages**

Researchers around the world identify stages in the way that teachers and students learn about and gain confidence in the use of ICT; Majumdar (2009, p. 9) mentioned a model based on UNESCO publication has been developed and expanded which conceives of four stages viz., Emerging, Applying, Infusing and Transforming. Emerging stages mean that teachers are beginning to become aware of the potential of ICT. Applying stages imply to that teachers may be learning how to

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use ICT for teaching & learning. Infusing stages mean that a variety of ICT tools are being used and integrated into the curriculum. Transforming stages involve new ways of approaching teaching and learning situation with specialized ICT tools to be used to explore a variety of real-world problems through innovative learning. The New Partnership for Africa's Development (NEPAD) has scored the level of African continent students' experience with ICTs and their proficiency in using them very low (Adomi, Esharenana, Kpangban & Emperor, 2010, p.2).

### **2.5 ICT in Somalia**

Countries in the various region of the world are at different stages of ICT development in terms of both infrastructure and application of ICT in teaching and learning. Within any such country, there may be uneven development from region to region, area to area, and even from institution to institution (Majumdar, 2009, p. 1). So it is important to know the status and stage of Somali ICT development since it is recovering from decades of conflict and militancy to be able to take advantage and benefit from the use of ICT in education.

In Somalia, there is a seemingly healthy ICT infrastructure, however, this is mostly found in the urban centers and especially the capital city, Mogadishu. This, therefore, translates to limited use of ICT in the school system in Somalia most of which are located out of Mogadishu. Policy efforts in education have been focused on reviving the education system, increasing enrolments, and reducing the school dropout rate and not ICT. There are some private schools that use ICT but more as an administrative tool than being integrated into the teaching and learning (Hare, 2007, p. 5).

The majority of Somalis is familiar with mobile phone technology and is open to accessing other types of technology. As yet, child friendly technology has not been introduced into schools in Somalia. The MoE is

willing to lead this process and will benefit from exploring the range of educational technologies that will be best suited to the contextual challenges they face before making informed and appropriate cost effective choices (UNICEF, 2013).

In Mogadishu most of the Secondary schools are not-equipped with ICT infrastructure, so the research focused to assess the influence of the independent variables of National education ICT policy and strategy, infrastructure availability, use and ease of access, and future support that teachers find useful.

The study was conducted within the capital city of Somalia, Mogadishu, as it provides an optimal focus for this study because it is where most of the secondary schools are developed in Somalia.

## **Research Methodology**

The aim of this research is to understand and find out the challenges that face the use of ICTs in Mogadishu Secondary schools. The study adopted a survey research design. The sampling unit was 7 randomly selected schools. From each school fifteen teachers were selected to be distributed the questionnaire using random sampling technique. This made a sample size of 105 subjects as a whole.

Data analysis employed descriptive statistical techniques by carrying out some type of grouping of data collected, there after placing data in common categories and computing percentage of each group after which the results were presented in tables and figures supported by some discussions.

The survey was designed to measure the factors affecting ICT integration in education particularly the barriers to the use of ICT in education. More particularly, the survey collects information on the views on a range of matters relating to ICT skill and usage, including:

- Their school's ICT capacity regarding performance of specific aspects;
- ICT policy/guideline at national and school levels.
- Future support that teachers find useful

## **Analysis and Interpretation of Data**

### **4.1 Profile of Respondents**

- The profile information of respondents included gender, age and experience in teaching of 105 respondents, 82 (78.1%) were males and 23 (21.9%) were females
- For the age groups, majority of teachers 36 (34.3%) were between 30-39 years old and the second rank belongs to age group between 25-29 years old.
- Regarding teacher levels, nearly quarter of the respondents 56 (53.3%) are senior teacher level 2. When it comes to teaching experience, nearly quarter of the respondents, 25(23.8%), had 2-3 years of teaching experience.

### **4.2 ICT capacity - performance of Specific Aspects**

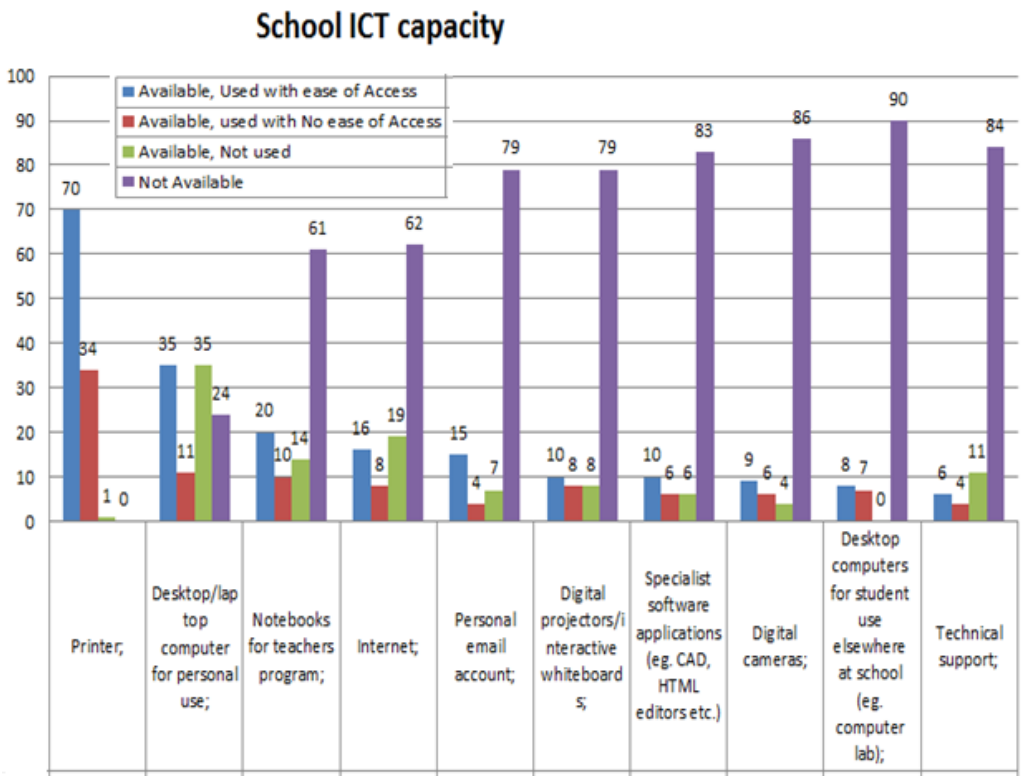
Because of the strong relationship between a schools' ICT capacity and the ICT skills and knowledge of its teachers, it is important to understand what comprises ICT capacity and how it can be improved (Dept. of Education WA, 2004).

The survey asked teachers to rate the availability, use and ease of access of 14 different ICT resources at their school, those being: Internet, Printer, Desktop/laptop computer for personal use, Notebooks for teachers program, SIS curriculum manager, Personal email account, School intranet, Digital cameras, Specialist software applications (e.g. CAD, HTML editors etc.), Technical support, Digital projectors/interactive whiteboards, Desktop computers for student use in

your classroom, Desktop computers for student use elsewhere at school (e.g. computer lab); and Laptop computers for student use.

**Table 1: Depicts the Levels of Availability, Use and Ease of Access with Each of the ICT Resources for all Teachers.**

Base: All Respondents	Available, Used with ease of Access	Available, used with No ease of Access	Available, Not used	Not Available
Printer;	70(66.7%)	34(32.4%)	1 (1.0%)	0(0%)
Desktop/laptop computer for personal use;	35(33.3%)	11(10.5%)	35(33.3%)	24(22.9%)
Notebooks for teachers program;	20(19.0%)	10(9.5%)	14(13.3%)	61(58.1%)
Internet;	16(15.2%)	8 (7.6%)	19(18.1%)	62(59.0%)
Personal email account;	15(14.3%)	4(3.8%)	7 (6.7%)	79(75.2%)
Digital projectors/interactive whiteboards;	10 (9.5%)	8 (7.6%)	8 (7.6%)	79(75.2%)
Specialist software applications (e.g. CAD, HTML editors etc.)	10 (9.5%)	6 (5.7%)	6 (5.7%)	83(79.0%)
Digital cameras;	9 (8.6%)	6 (5.7%)	4 (3.8%)	86(81.9%)
Desktop computers for student use elsewhere at school (e.g. computer lab);	8 (7.6%)	7 (6.7%)	0 (0%)	90(85.7%)
Technical support;	6(5.7%)	4 (3.8%)	11(10.5%)	84(80.0%)
SIS curriculum manager;	0 (0%)	0 (0%)	0 (0%)	105(100%)
School intranet;	0 (0%)	0 (0%)	0 (0%)	105(100%)
Desktop computers for student use in your classroom;	0 (0%)	0 (0%)	0 (0%)	105(100%)
Laptop computers for student use.	0 (0%)	0 (0%)	0 (0%)	105(100%)



**Figure 1: School ICT Capacity**

**The results found in summary showed that:**

All of the target secondary schools are totally not having the following resources of SIS curriculum manager; school intranet; and Desktop computer for student use in classroom; and Laptop computers for student use. More than 60% of respondents said that their school does not have all the listed resources except printer and Desktop/laptop computer for personal use. Printer is the only resource that is available in all schools, used with ease of access of about 67% of teachers while the remaining showed not having ease access. Desktop/laptop computer for personal use for teachers, 33% of respondents replied that the resource is available, used with ease of access while equal number agreed with them

regarding the availability but reported that they have not used. Regarding Desktop computers for student use elsewhere at school (e.g. computer lab) is not available in most of the schools. Personal email accounts and internet are not widely available to teachers; they are only 15%, and 16% respectively.

### 4.3 ICT Policy

Teachers were asked in the survey the existence of National ICT education policy/guideline by answering yes or no; and when did their school start ICT education?

#### The questions asked where:

- Does your national government specify an ICT education policy/guideline?
- Does your government guarantee standardized ICT education nationwide?
- Does your SCHOOL specify an ICT education policy/guideline?
- Does the government grant an extra budget for the ICT education at your school?
- When did your school start ICT education? (Select grade level)

#### There answers are shown in table 2

						Yes	N0			
Does your national government specify an ICT education policy/guideline?						0	105			
Does your government guarantee standardized ICT education nationwide?						0	105			
Does your SCHOOL specify an ICT education policy/guideline?						75	30			
Does the government grant an extra budget for the ICT education at your school?						0	105			
When did your school start ICT education? (Select grade level)						G9	G10	11	G12	N/A
						0	45	0	30	30



**The results found in summary showed that:**

- ✓ There is no national government ICT education policy that guarantees standardized ICT education nationwide.
- ✓ Currently there is no budget from the government for support to the ICT education at schools, but 75 (71%) respondents reported that their school specifies an ICT education policy/guideline.
- ✓ Regarding in which grade schools start ICT education, 45(42%) mentioned that they start at grade 10 while 30 (29%) start at grade 12; the remaining 30(29) not yet started ICT education.

**4.4 Future Support that Teachers Find Useful**

This section discusses the types of support teachers told us they would find useful to assist them to further develop their ICT knowledge and skills and apply them in the classroom. This was an open ended question and the responses made a total of 9 different items. Items of similar type were summed up from those who responded to the question and a summary of their responses are shown in Table 3

<b>Future support that teachers find useful</b>	<b>n=105</b>	<b>Percent</b>
Need for sufficient computers and computer labs	47	45%
Relevant professional development about using ICT in classroom	41	39%
ICT technical support to help teachers	37	35%
Reliable internet access	31	30%
Laptop for teachers	19	18%
School ICT budget support	15	14%
Digital projectors	13	12%
Sufficient digital resources	8	8%
Sufficient suitable software	7	7%
No comments	53	50%

The results in summary showed that the statements "Need for sufficient computers and computer labs" and "Relevant professional development about using ICT in classroom" are mentioned by nearly all of those who made comments about this section, their others interests can be seen from the above table.

## **Conclusion and Recommendations**

### **5.1 Conclusion**

In general most of the respondents have basic idea about the concept of ICTs integration in education and its role for the introduction of modern communication tools. The results found are similar to those found by Malcolm, E. and Godwyll, 2009, p. 21, about the problems of lack of adequate computers and other ICTs tools especially in rural schools, poor internet connectivity, lack of adequate manpower and lack of coherent ICT policy framework in Selected Ghanaian Schools.

Therefore, the use of ICT in education in Mogadishu secondary school systems in Somalia is an important step in promoting innovation and rebuilding of the country.

However, the educational system currently having problems such as lack of adequate computers and other ICTs tools, lack of national as well as school level ICT policy framework, poor internet connectivity. In conclusion, the introduction of ICTs in education in Mogadishu schools is important and beneficial for the future life of students in participating schools as well as at higher education but currently it is between the emerging and applying stages which are the lowest levels of the four stages identified by the researchers in the way that teachers and students learn about and gain confidence in the use of ICT.

## **5.2 Recommendations**

The set of policy, social, economic, technical and environmental challenges that confront ICTs integration in schools are significant and require an education system that can develop means to overcome barriers identified in the research.

The government should provide policy direction to address issues such as provision of computer laboratories, staffing the laboratories with permanent technology coordinators etc. and look at the broad range of educational policies, programs and structures that must also be changed to schools have to address the challenges confronting ICTs integration in schools.

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# *Khat Use Prevalence & Its Associated Factors among Men in Mogadishu, Somalia*

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## *Abstract*

Khat, known in Somalia as "qaad" or "jaad", is a plant whose leaves and stem tips are chewed for their stimulating effect. Khat use is widely found to be socially accepted habit in most of the countries geographically situated where the herbal drug is cultivated and chewed as a recreational and socializing drug. Khat has negative economic and health impact on the individuals engaging in the habit of khat chewing. There were no studies conducted to investigate the prevalence and associated factors of khat chewing in the study area.

A cross sectional study was used. A structured self-administered questionnaire was used to collect data from the respondents at a cluster sampling. Quantitative data analysis was used. This study took into consideration 385 respondents as sample size to determine feasible findings about topic under the study.

In general, more than half of the participants were khat chewers and the majority of them reported that they chew khat three or more times per week. The prevalence of khat chewing is high among males aged 20 – 34 years in study area who are married, had informal education and had a total family income of USD  $\leq$ 100 per month.

Finally, this study recommends increasing public awareness of the potential health hazards of khat chewing as well as integrating education about khat into the curricula of the primary and secondary schools in order to save the young generations and to encourage them to use other recreational things rather than khat chewing.

**Key words:** Prevalence. khat, factor.

## **Introduction**

The khat plant (*Catha edulis* Forsk), is a flowering perennial green tree which is primarily found wild in many parts of Africa and the Arabian Peninsula for centuries. In Africa the khat tree is specifically grown from Cape to the mountains of north-east Africa and Madagascar. Whereas, in the Arabian Peninsula the leaves of *Catha edulis* Forsk is found in Yemen and regions of the Saudi-Arabia or in other words South-western Arabian Peninsula. It grows well within altitudes between 5000 and 8000 feet. When cultivated it is kept at around 20 feet to allow for ease of harvesting, the tree grows to heights in excess of 50 feet (Andersson & Carrier, 2009; Favrod-Coune & Broer, 2010).

Khat use is a socially accepted habit in most of the countries geographically situated where the herbal drug is cultivated and chewed as a recreational and socializing drug (Al-Habori, 2005). However, the West's perspective on khat consumption differs from that of traditional-use regions. Khat can be regarded as a psychoactive plant taken out of its cultural environment, used in new settings, perceived as an object of abuse and targeted for elimination (Carrier, 2007).

Khat is the foremost drug that harms the Somalian people. The leaves of the khat plant are used for their exciting purposes. The chemically unstable alkaloid cathinone, S (-)-alpha-aminopropiophenone, present in the fresh plant material, is the main psychoactive agent. Numerous laboratory studies confirmed that cathinone resembles amphetamine in chemical structure and affects the central and peripheral nervous system and behavior similarly. Khat use has been related to numerous somatic and psychiatric health sequelae (Odenwald, Hinkel, Schauer, Neuner, Schauer, Thomas and Rockstroh, 2007).



Hassan, Gunaid, Elkhally and Murray-Lyon (2003) stated that the influence which accounts for the popularity of khat is its central nervous system stimulation, believed to be induced by cathinone, an active ingredient of khat leaves. Cathinone has a more rapid and intense action compared with cathine due to its higher lipid solubility which facilitates access into the central nervous system. Several studies showed that the psychostimulant effects induced by chewing khat include a moderate degree of euphoria and mild excitement resulting in promotion of social interaction and loquacity. While attaining a subjective state of well-being, the chewers feel an increase in alertness and energy together with enhanced depth of perception. These effects were found to be a maximum between 1.5 – 3.5 hours after starting to chew and they were progressively replaced by mild dysphoria (generalized dissatisfaction with life), anxiety, reactive depression, insomnia (inability to sleep) and anorexia (loss of appetite).

Culture of khat consumption in communities in the Horn of Africa and the Arabian Peninsula combines two main purposes; religious and culturally purposes (Yusuf, 2011). In Ethiopia, for example, chewing-khat is linked with agricultural labour and is also historically easily associated with religious contemplation and meditation (Andersson & Carrier, 2009). In the past times, the use of khat was observed frequently among Ethiopian Muslims who consumed it for prayer and during the fasting period of the holy month of Ramadan (Apps, Matloob, Dahdal & Dubrey, 2011). In other instances, there are groups of khat users who have used khat not only for religious and culturally purposes, but for various reasons. Some of these groups aspire more for the psychological benefits of the group interaction that occurs during the khat sessions which is affirmed as one reason for its intake (Yusuf, 2011). While, other individuals consume khat in preparation for battle grounds, a ceremonial activity including weddings and/or it is used as an appetite suppressant

(Apps *et al.*, 2011). The use of psychoactive substances in religious and healing rituals, in semi-ritual practices which reinforce social and political bonds and simply as recreational activity is a universal cultural practice (Gebissa, 2010).

In Yemen, the prevalence of khat chewing for the entire population is 67.9%. This includes 80% of men and 60% of women. Current “daily use” is estimated at 23.6% of the general population (31.8% of men and 8.9 of women). Khat chewing deeply affects all facets of Yemeni social life and has become an essential part of social gatherings and activities. Yemenis believe that khat chewing increases energy and relieves depression and physical fatigue. It has been reported that khat chewing adversely affects people’s economic development and causes public health problems. Its use has been associated with unemployment, decreased family income, lower levels of education, depressed living conditions, family dysfunction, and wasting of time. Khat chewing is also associated with an increased risk of acute myocardial infarction, high blood pressure, oral cancer, and haemorrhoids (Al-Abed, Sutan, Al-Dubai & Aljunid, 2014). They are also stated that malnutrition and loss of appetite have also been observed among khat users in addition to gastritis and constipation.

Little is currently known about the prevalence of khat chewing by the countries that can no longer have the basic security and development functions, and that have lost effective control over their nation. Based on interviews of large numbers of participants, it is reported that khat and other drug use exist among active armed forces and militia personnel in Somalia, where decades of civil war have produced a vacuum of state power and where in some regions law is not enforced (Odenwald, Hinkel, Schauer, Neuner, Schauer, Thomas and Rockstroh, 2007).

In Somalia, khat-chewing became a pervasive problem since the mid-1960s. Before 1960, khat use was found on a limited scale and was chewed only in some specific places mainly at the northern areas of the country which lies close to the khat production area of Harerge region of Ethiopia. The economic problems linked with khat-chewing include the spread of corruption, the theft of public and private property to support the habit, damage to people and to property caused by accidents that occur under the euphoric state induced by the use of the drug, and the loss of many working hours among civil servants and private employees (Yusuf, 2011). On the other hand, in the social sphere of Somalia, family disruption is a prominent problem, which includes frequent quarrels, breach of family ties, neglect of education and care of children, waste of family resources, encouragement of prostitution, as well as encouragement of family members to become involved in khat-chewing habit.

Today the use of khat has turned out to be a national problem since most Somali urban men chew it (Abdullahi, 2001). In addition, Bhui and Warfa (2007) have said that there is no exception of khat use in the present-day Somalia. Due to the fact that the very people who are likely to be recruited for warfare and are active in conflict zones in Somalia; specifically young men are exposed to khat use and violence, who will then have the most difficulty adjusting to a life free of violence. Moreover, the challenge facing Somalia and other conflict zones in general is that it is the young people who are the most vulnerable to developmental insults, which can lead to long-lasting and, in some instances, permanent mental health and physical health problems are involved in the habit of khat chewing.

Although Somalis have recently started to claim that khat as a vital part of Somalis culture, but in most parts of Somalia the habit of khat-chewing dates back decades rather than centuries (Beckerleg, 2010).

Khat itself does not grow in Somali areas; therefore, most of the khat consumed by Somalis is imported from either neighboring Ethiopia or Kenya. Importing khat leaves contributes greatly to the economies of these countries while depleting the incomes of Somali families (Abdullahi, 2001). No studies have addressed and documented the factors associated with khat chewing among Somali men. Hence, this study was designed to determine the prevalence of khat chewing and its associated factors, particularly socio-demographic, socio-economic and family factors.

## **Materials and Methods**

### ***1.1. Study Design and Population.***

A quantitative cross-sectional study was conducted in Mogadishu, Somalia, from September 2015 to January 2016. A cross-sectional study which is concerned with describing the characteristics of an event, community or region providing data about the population or item being studied by only describing the who, what, how, when and where of situation at a given time but does not go into finding what causes or caused. Mogadishu locally known as Hamar is the largest city in Somalia and the nation's capital. Located in the coastal Banadir region on the Indian Ocean, in southeastern Somalia, the city has served as an important port for centuries. Mogadishu is situated in Banadir, an administrative region in southeastern Somalia and is divided into the following administrative districts: Abdiiaziz, Bondhere, Daynile, Dharkenley, Hamar-Jajab, Hamar-Weyne, Heliwaa, Hodan, Howl-Wadag, Karan, Shangani, Shibis, Waberi, Wadajir, Warta-Nabada and Yaqshid. The population data suffers from a lack of any recent census, and existing estimates are inconsistent, but according to Mogadishu City authority, for their reference from Minister of Planning of Somalia's Federal government in collaboration with the United Nations Population

Fund (UNFPA), the latest data in 2014 estimates that 1,650,227 people are living in Mogadishu.

### **1.2. Sampling Procedure and Sampling Frame.**

The sampling units were all the sixteen districts in Banadir region, one of these districts was selected for the study using simple random sampling. Then, convenient sample of participants from one of sub-districts in the selected district were included in this study. Targeted men were those who were aged above 20 years to ensure that all subjects were responsible for their decision. People aged <20 years were excluded from this study.

The sample size has been chosen according C.R. Kothari (2004) sample size. It has been calculated using the following formula.

$$n = \frac{z^2 p q}{d^2}$$

- n = the desired sample size/required.
- z = the standard normal deviate at the required confidence level (95%; standard value of 1.96).
- p = the proportion in the target population estimated to have characteristics being measured, e.g., estimated prevalence.
- q = 1 – p
- d = the level of statistical significance/margin error at 5%; standard value of 0.05.

*There is no khat chewing estimation available of the proportion in the target population, so we assumed to have the characteristics of interest, 50% were used as recommended by fisher (2003).*

$$n = \frac{(1.96)^2 (0.5) (0.5)}{(0.05)^2} = 385$$

Therefore, three hundred and eighty-five men participated in this study. To ensure the diversity of the sample, data was collected in high traffic locations in different days.

### **1.3.Data Collection Technique.**

Data were collected by using structured self-administered questionnaires which was prepared first in English and then translated into Somali and back to English. Two data collectors who were under graduate nursing students were involved, and training was given; mainly on the purpose of the study, handling ethical issues and method of data collection.

### **1.4.Data Analysis.**

The collected data were cleared and checked for completeness and were entered, compiled and analyzed using Ms-excel program which was used appropriately; percentage were used as a statistical test. Data cleaning was performed to check for accuracy, consistencies, missed values and variables. Any error identified was corrected.

### **1.5.Ethical Considerations.**

Good explanation for the participants was done before filling the questionnaire, participants were assured of their privacy and non-participation if they so wished. All the study participants were informed about the objective of the study and their verbal consent was obtained. Additionally, the researcher also explained that confidentiality and privacy of the information were seriously respected.

## **2. Results**

### **2.1. Descriptive and General Characteristics of Related Factors.**

Out of the total three hundred and eighty-five questionnaires were distributed, three hundred and thirty-three were returned making the response rate 86.5%. The data obtained from the questionnaire, reveals that 202 (60.7%) of the participants were khat chewers. 184 respondents between 20 – 34 years of age representing 55.3%, formed the majority. In Table 1, the majority were married (54.4%), had informal education (37%), and (70.3%) were unemployed. Most of the respondents (77.8%) had a total family income of USD  $\leq$ 100 per month. Most of them lived in rented houses (59.5%), had a family of five or more members (52.3%), and had less than three children (59.5%). More than half of them practiced family social gatherings for more than three times per week (54%). The majority of their family members were khat chewers (58%) and most of them chew khat  $\geq$  3 times per week (56%).

**Table 1: Descriptive and General Characteristics of Related Factors.**

VARIABLES	#	%
<i>Sociodemographic and socioeconomic factors</i>		
<i>1. Age group</i>		
20 – 34 years	184	55.3
35 – 54 years	118	35.4
Above 54 years	31	9.3
<b>Total</b>	333	100
<i>2. Marital status</i>		
Single	124	37.2
Married	181	54.4
Divorced	28	8.4
<b>Total</b>	333	100
<i>3. Educational level</i>		
Primary	65	19.5
Secondary	47	14
Informal	123	37
Illiterate	84	25.2
University	14	4.2
<b>Total</b>	333	100
<i>4. Employment status</i>		
Employed	99	29.7
Unemployed	234	70.3
<b>Total</b>	333	100



VARIABLES	#	%
<b>5. Family Income/month</b>		
≤100 USD	259	77.8
100 – 300 USD	55	16.5
>300 USD	19	5.7
<b>Total</b>	333	100
<b>6. Chewing khat</b>		
Yes	202	60.7
No	131	39.3
Total	333	100
<b>Family context factors</b>		
<b>7. House type</b>		
Tenant	198	59.5
Owner	135	40.5
<b>Total</b>	333	100
<b>8. Size of the house</b>		
≤3 rooms	208	62.5
>3 rooms	125	37.5
<b>Total</b>	333	100
<b>9. Family size</b>		
< 5 members	159	47.7
≥ 5 member	174	52.3
<b>Total</b>	333	100

VARIABLES	#	%
<i>10. Number of children</i>		
< 3 children	198	59.5
$\geq$ 3 children	135	40.5
<i>Total</i>	333	100
<i>11. Family social gatherings</i>		
$\leq$ 3 times per week	153	46
> 3 times per week	180	54
<i>Total</i>	333	100
<i>12. Family members chewing khat</i>		
Yes	193	58
No	140	42
<i>Total</i>	333	100
<i>13. Frequency of chewing khat by family members/week</i>		
<3 times	85	44
$\geq$ 3 times	108	56
<i>Total</i>	193	100

## **Discussion**

This is the first study that explored khat chewing among men in Mogadishu with a specific focus on socio-demographic, socio-economic and family context factors contributing to khat chewing. Previous studies reported that khat chewing was associated with age, gender, residence, and occupation (Milaat, Salih, Bani, and Ageely, 2005). The literature reported that the majority of khat chewers are between the age of 25 – 34 years for both sexes (Zelege, Awoke, Gebeyehu, and Ambaw, 2013). This study confirmed this finding as most khat chewers identified were between 20 and 34 years of age. Also it was discovered that married men were more likely to chew khat compared to single and divorced men. This might be caused by taking no responsibilities by husbands to cherish their wives and their children as well as wives make khat more available while encouraging their husbands to share the family income gatherings. However, further qualitative research is required to clearly explain the role of wives in the matter.

In this study the overall prevalence rate of khat chewing among men was (60.7%). This percentage is much more than its prevalence in Nairobi (32.6%) and Mombasa (37.2%) in Kenya which is the main exporting country of khat to Somalia (Kikuvi & Karanja, 2013). The possible explanations for this difference could be the generic factors including normalization in the community, social mobility and accessibility of khat as well as the role of policy makers in health education is missing to demonstrate the health hazards of khat chewing to the community which can be identified as the major contributors to the widespread of khat chewing habit in Mogadishu, Somalia.

Previous studies reported that khat chewers have higher unemployment rates and had lower levels of education, with their majority living in deprived areas with diminished levels of social interaction (Manghi, Broers, Khan, Benguettat, Khazaal, and Zullino, 2009). However, this study demonstrated that the level of education was not significantly associated with khat chewing, although khat chewing is not only used by the illiterates, or those who had informal education, but also consumed by men with high educational level. Likewise, no association was found between khat chewing and employment status. Men with low incomes in this study were more likely to chew khat compared to those with higher incomes. They have no means to buy khat, but they involve their families who live abroad who send them money as well as their wives. This study also illustrated that too many children leads to increase in the burden of responsibility and can diminish the rate of khat chewing as the study shows that most of the participants had less than three children.

A higher number of rooms in the house may not facilitate the allocation of a specific room for khat chewing in Somali society, because a “khat session” occurs mostly in the streets, which means that khat chewing mostly does not necessarily need to be in a closed room. So the researcher found that a higher number of rooms in the family home were not significantly associated with khat chewing, whether the house was rented or owned. Large family size appears to increase the likelihood of family members who chew khat which possibly encourages other family members in the family chewing khat. This study also accepted that a higher incidence of family social gatherings was associated with khat chewing. Also it was demonstrated that khat chewing by family members had a noticeable effect of khat chewing by the men participated,

indicating that men were influenced by the behaviour of their family member and tended to share the habit. A study by Zeleke, Awoke, Gebeyehu, and Ambaw in 2013 stated that if one member of the family is khat chewer, this may affect khat chewing among other members in the family.

This study was limited by its cross-sectional design that cannot prove the causal relationship between the variables; longitudinal studies would provide better assessment. Since the researcher had limited time for the study, this was not feasible. The participants also were joined from one sub-district in a single district only. In addition, a household survey was impossible at the time of the study due to financial constraints while the researcher was paying all the research expenses. Data was collected using researcher-administered questionnaire; participants may overestimate or underestimate their responses. Despite these limitations, the researcher hopes that the results contribute a lot to the body of knowledge.

## **Conclusion**

More than half of the men participating in this study were khat chewers. This study also demonstrated that family members clearly play significant roles in khat chewing by Somali men. Other factors were age, being married, number of children and frequent family social gatherings. A particular attention should be given to young men and the new generations. Further longitudinal research with bigger and representative sample size is required.

## **Recommendations**

**Based on the findings of the study the following recommendations are made:**

- ❖ Urgent action is necessary to be done by the local authorities and the NGOs to control khat usage and its chewing.
- ❖ To increase public awareness of the potential health hazards of khat chewing.
- ❖ To support scientific research on khat in different institutions and universities and to explore the different effects of khat on public health.
- ❖ To integrate education about khat into the curricula of the primary and secondary schools.
- ❖ It is better to use other recreational things rather than khat chewing.

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