

SUSPECTED CORRELATION BETWEEN CANCER INCIDENCE AND INDUSTRIAL AND NUCLEAR WASTES IN SOMALIA.

DR. ABDULKADIR A. EGAL

ABSTRACT

The global industrial development race for superior technological advancements has produced an unprecedented hazardous waste by-product crisis. An environmental watchdog, the United Nations Environmental Program (UNEP), and conventions to deal with hazardous wastes globally, have been put in place. However, some countries/companies have opted not to abide by these noble conventions and rules, and proceeded to surreptitiously dump hazardous wastes illegally in unsuspecting corners of the earth. Stateless Somalia has been one of these places. The Somali waste-dumping case is very alarming, resulting as it did in high rates of negative health outcomes. Both the frequency and types of cancers have skyrocketed at unprecedented levels. This paper sought to investigate possible health outcomes that can be linked to hazardous waste dumping in the Somali environment.

CONCLUSION

Despite the limited data available and other challenges, this study unfortunately found linear correlations of increased prevalence of cancer and recent hazardous dumping along the Somali coast. However, further investigations will be needed, together with a contingency plan to deal effectively with this new public health threat in the world.

Key words: Hazardous materials, industrial and nuclear waste, Cancer and carcinogenic, illegal dumping.

Motivation: This paper will, it is hoped, open a corridor for a number of investigations and remedies to be carried out thereafter. If this happens, then similar situations elsewhere in the globe could use lessons learned from Somalia's experience.

BACKGROUND

The global Industrial development race for superior technological advancements has produced unintentional and unprecedented hazardous by-product wastes crisis. In this restless race for technological superiority, the developed countries have accumulated more industrial wastes than they can dispose of over the years. After countless debates and conferences, world leaders have finally agreed to establish an environmental watchdog, the United Nations Environmental Program (UNEP) and have held conventions to deal with hazardous wastes globally (Moeller, 1997). Some countries honored these moves while others were and still are using unscrupulous methods to dump wastes, usually in innocent and unaware communities around the globe. They set up fictitious companies to carry out these illicit, immoral operations. Usually, these lucrative shadow companies target poor countries where there is no effective government or those engaged in civil war. Unfortunately, these illicit organizations are not concerned about health outcomes for unsuspecting victims of industrial wastes. Here Somalia makes the perfect case where both industrial and nuclear wastes were indiscriminately dumped (Poaletta, 1993; Hassan, 2007; Carazzolo, Chiara and Scalettari, 1998; Massari and Monzini, 2004; Orloff and Falk, 2004; Tolba, 1992; UNEP, 2005). Depleted Uranium shells (DU) were reportedly used in the conflict with Somali clan militias during the United Nations (UN) military intervention in Somalia of 1992 –

1994 known as Operation Restore Hope (von Ilseman, 2001). Most of these wastes (uranium radioactive waste, lead, cadmium, mercury, industrial, hospital, chemical, leather treatment and other toxic waste) were buried at shallow shores and seabeds to avoid costs and international responsibilities (Mohamed, 2001). Unfortunately, these perpetrators are unaware that the environmental consequences of their actions would most probably knock on their own doors some day through environmental media.

The negative results of these dumps on the Somali people are very alarming: especially on the rates of negative health outcomes in a country in the midst of civil strife. Both the frequency and types of cancers in affected areas of Somalia have spiked up spectacularly. Concomitantly, most of the Somali people strongly believe that the new epidemics emanated from this dumping and from the use of depleted uranium shells in their environment. The mess created by these dumpers is so complex that immediate remedy seems impossible. This effort, therefore, looks into this grave development with the hope of reporting the extent of damage caused by these dumps vis-à-vis the rise of cancer incidents in Somalia, especially areas close to the alleged dumpsites and war zones.

WASTE BURIALS ACCOUNTS IN SOMALIA

Reports have shown that the burial of industrial wastes in Somalia dates back to the 1980s when the country was ruled by a dictatorial, corrupt regime (Carazzolo, Chiara and Scalettari; 1998). The dumping of industrial wastes began in 1989 when dictator Siyaad Barre began to realize his imminent downfall, dumping these wastes in rebel-sympathizer regions of Somalia. For instance, one of the first such dumpsites is in an area ten kilometers north of Obbia (Hoby) and five kilometers from the shore (Carazzolo, Chiara and Scalettari; 1998). However, the lawlessness

that resulted from the overthrow of the dictatorial regime whetted the appetite of both unscrupulous companies and ignorant greed driven individual warlords, as a result of the chaos stemming from the ongoing civil war (*The Guardian*, September 1992). Globally, there was an outcry over the alleged dumping, leading to an investigation from UNEP after international media, and local inhabitants showed evidence of mass contract dumping in Somali coastal areas (fig.1). Some media reported washed away containers lying on the shores of the Indian Ocean at the Somali coast. For reasons not known to date, the outcome from UNEP investigation was never shared with concerned international bodies. However, the *Famiglia Cristiana Journal* obtained the report of a small group hired by UNEP to investigate the incident in 1998. Their initial report confirmed the existence of such dumping sites on the Somali coast. The group confirmed and found big steel containers of six by six by four meters long with no apparent markings (fig 1). One of such giant containers was marked "No 6." The containers were found in Adale (Cadale), a village about one hundred kilometers north of the capital, Mogadishu. The actual number of containers constituting the original consignment may never be known. In addition to this hastily buried waste, there were also several ships sunk in the Indian Ocean off the shores of Somalia during the period of 1992 to 1994. One ship was sunk at Mogadishu, two vessels farther south at Merka and one at the city of Brava (Barraawe). It is believed that these known ships were loaded with hazardous wastes. Some local people tried to loot the ships and found only sealed containers. Reportedly, some of the fortune seekers who made the initial contact with these mysterious consignments suffered bruises and burns and even sudden death within hours, as they tried to pilfer the containers. The tsunami event in January 2005 has highlighted the very existence of the issue after more mysterious containers were washed ashore

from their shallow dumpsites on the Indian Ocean coast of Somalia. Unfortunately, the interest about the hazardous waste dumping at the Somali coast lost its attention with the international community within months of the tsunami event.

CANCER INCIDENCES SINCE BURIAL AND REPORTED USE OF DU SHELLS IN SOMALIA.

Traditionally, hepatic cirrhosis (liver cancer) was the only reported cancer in Somalia purportedly caused by high consumption of animal fat and/or complications from chronic malaria sickness. This was mostly prevalent among the nomadic tribes whose main diet was milk and meat. This unique cancer was not common in the urban and coastal fishery communities. However, from 1993 onwards, new cancers have emerged both in higher frequency and in various forms in areas that were almost cancer-free. This trend has reversed the incidence of cancer from the nomads to coastal and urban dwellers, especially those close to dumpsites or war zones like Mogadishu and all coastal areas from Brava city to Obbia (Hoby) area as well as coastal areas of the Puntland State of Somalia along the Indian Ocean. For instance, up until 1995 oromandibular or gastro-intestinal cancers were almost non-existent in Somalia's epidemiological archives. Clearly, the emergence of new cancers and the use of DU shells compounded with toxic dumps in Somalia seem to show a direct correlation. The unusually high incidence of cancer manifestations among the Somali public and subsequent immediate deaths at alarmingly high rates suggest stochastic effects of both acute and chronic exposure.

In spite of this evidence, there is no monitoring agency or technique put in place to assess the rate of radiation propagation or the biochemical damage in Somalia. Apparently the kinds of exposure to cancer in Somalia seem to be linear and quadratic in nature, suggesting the types of radiation to be X and Gamma rays (BEIR Committee, 1980). This is only a

hypothetical view and should be used only for guidance purposes when starting serious scientific investigations in the Somali case. There are also chemical wastes, which are contributing to the exposure risk. To investigate such complex exposure would need both chemical and nuclear radiation experts to investigate the radiation doses vis-à-vis chemical and biochemical waste contributors and their interactions. Once this is settled, the cleanup or remedy efforts could begin on an emergency basis.

METHODS AND ANALYSIS

After due consultations, to substantiate the issue of correlation of toxic waste, DU shells and the emergence of new cancers in Somalia, the Red Crescent Hospital in Dubai was chosen to investigate the problem. This hospital is quasi-charity sponsored, less formal than the other hospitals in Dubai in terms of travel documents, is much cheaper, and is equipped with modern facilities. Somalia has no modern hospitals that can investigate tertiary health issues due to lack of equipment and skilled personnel. What little infrastructure existed in the hospitals was completely destroyed by the ongoing civil war. In 2004, Somalia had a population of about 10.9 million in which thirty-two percent, or 3.5 million, are urban dwellers and the rest live in rural areas. There was no census since 1975 and calculations were made on the basis of the last census and an annual growth rate of three percent (Helen Metz, 1992). At the moment, the annual cancer incidence in urban populations can be hypothetically assumed to be about three percent or 105,000 cases (conservative estimate – WHO puts less than 0.09% (WHO, 2009). Etiologically, 90% of the causes of urban cancer patients (n=94,500) are believed to have originated from carcinogenic materials of the hazardous wastes buried in various parts of the country. Unfortunately, most of the affected patients from these industrial and biochemical wastes received little or no medical attention, especially the poor who could not

afford to go out of Somalia for proper medical attention. The majority of such persons (n= 89,775) suffered until they unfortunately passed away, given the high mortality rates of these new cancers. (Markakis, 1998) The maximum survival periods from the onset of these new cancer diagnoses to ultimate death is relatively very short and ranges from four to six months at most. On the other hand, those cancer patients who could afford to travel outside Somalia (n = 4,725) were also restricted by their respective financial resources. Those patients with the least financial resources had to travel to neighboring Kenya, the second category to Arab Gulf States, mainly United Arab Emirates (UAE) and the third category, with much better financial resources, opted for more modern and sophisticated medical services in western countries. For the purposes of this study, only those in the UAE, especially Dubai city, were investigated due to financial constraints and practical considerations. There are three general government hospitals and numerous private and charity ones in Dubai. A charity hospital, the Red Crescent, with modern equipment, subsidized medical fees and less formal immigration practices will be used in this study, since this hospital is the one most frequented by the poorest Somali patients who came to the city of Dubai (UAE). Other hospitals are strict and do not accept patients without permanent residence status or UAE nationality and most of the Somali patients do not possess these qualifications for admission. Thus, understandably, those patients without proper papers will opt for less formal hospital(s).

If one works on the basis of WHO figures in which the cancer deaths were calculated to be around 0.09% (n=6852) in 2005 and the projected percentage to be around 0.21% (n= 16,784) in 2030 -- an increase of about forty-three percent can be anticipated in the year 2030. Though the WHO estimates are smaller than those calculated in this study, luckily the WHO cancer reports do mention all new cancers found in this study in their

report of 2005 (WHO, 2009). The most important point is the reconfirmation of new cancers in Somalia during the civil war and not mere theoretical calculations without substantiations.

Practically, most of the Somali cancer patients are either in the advanced stages of their respective malignant cancers, or have no time for obtaining resident papers within an acceptable time frame, or are short of money to go to other hospitals in UAE. On the other hand, it is not that easy to obtain data for research purposes from the Red Crescent hospital, as the bureaucratic formalities are immense and a great deal of time and courtesy must be invested. Nevertheless, this researcher got around this problem by obtaining a letter from the then Somali Minister of Fisheries and Marine Resources, which facilitated the data collection. The data, although limited in nature, is reported in tables 1 and 2.

The study sorted out only Somali cancer patients during an eight-month period between 2003 and 2004. All these patients came from southern Somalia, especially towns close to dumpsites like Mogadishu, Garowe, Hobyo, Brava and Bardhere. Owing to the nature of the available data sample ($n = 13$), some descriptive data analysis coupled with impact assessment methods were employed to deduce some meaningful trends. These cancer patients from the concerned hospital's medical records ($n=13$) represent roughly 0.3% of those who sought medical attention abroad ($n=4,725$). One can imagine the extent of the problem if only 13 patients could be traced. How many other patients are yet to be discovered before they die? Certainly many research investigations on this front are needed.

RESULTS

The average age of the patients was fifty-four years, the youngest was thirty-five and the oldest was seventy. More than fifty percent of the cancer

patients were female. However, most of the younger patients were females, suggesting that, in future, more of the younger women will likely be affected, should one extrapolate the available data to the general Somali population (Fig. 3). Furthermore, more than seventy-two percent of the affected female patients were less than or equal to fifty years of age. Considering the data available from such a small sample, due to the small percentage of cancer patients from Somalia with financial resources, the actual effect on the general public health may never be known in its fullest number, until rigorous and proper research is carried out. This in fact may turn out to be a ticking time bomb that might haunt world leaders in the near future. The disinterment of wastes from their respective shallow dumpsites in the recent tsunami incident of December, 2004, in Somalia may be just the tip of the iceberg. From this data, unfortunately, one can image how many more cancer patients have died due to lack of funds to travel abroad or, worse still, how many more are on the way to developing deadly disease states not yet known in this developing African country.

DISCUSSION

The issues of waste dumping and of alleged use of DU shells in Somalia are serious problems. The effects of these hazardous substances mostly impact women, who are innocent and who constitute the most productive members of that country's society. Although more of the damage emanates from the dumped wastes rather than from the DU utilization, the cumulative harm to human lives in this part of the world is undeniable. The military and political interventions in Somalia in the early 1990s were a disaster in UN history. From the start, there were no apparent and clear goals for intervention other than a generalized approach of assisting Somalia to overcome hunger and revive public institutions. There were no rules or control over what, when and how weapons were to be used. It was

with a *carte blanche* for the military personnel to do whatever they deemed necessary. Some critics reported that Somalia was a weapons test ground. It is not the scope of this paper to cover all the issues and allegations that were made in what should have been and otherwise was a well intended life-saving operation that turned disastrous. History will speak out eventually for itself.

The real intent of this paper relates to the nature of the cancers now emerging in Somalia. Direct contact with extremely carcinogenic materials from the dumpsites, or those shed in the general environment during the fighting between local militias and UNOSOM (United Nations Operations in Somalia) forces that undeniably used DU shells in 1993 military operations happens to be a fact. For instance, cancers of the gastrointestinal track, skin and bladder clearly indicate consumption of contaminated foods. This should not be a surprise, since the seeds of bad health were sown in Somalia. That contamination of the food chain and the environment will be here for many years to come is surely very disturbing, especially due to the fact that the Somali people have no effective central government, resources or know-how to clean up this mess. For instance, in Brava (about 200kilometers south of Mogadishu), fishermen tried to empty mysterious drums, that were washed ashore, to use for domestic purposes. Within minutes most of those who had made direct contact suffered skin burns, and some died within hours (Local Newspapers that reported the incident include QARAN PRESS; XOGOGAAL; SAHAN; BANAADIR during 1997, 1998, 1999 and 2000).

CONCLUDING REMARKS

The health prognosis of future Somali generations is very discouraging. Unless all able countries and/or organizations intervene and help Somalis before it is too late, the future of Somalia is indeed bleak. All the available

data suggest clear correlations between dumped wastes, DU shells and the emergence of new malignant cancers in Somalia. It is of no use to start unproductive finger-pointing acrimonies; what is needed is to maturely react and mitigate these unfortunate man-made disasters. For sure, this environmental abuse will not only affect Somalia and its neighbors but will inevitably impact the rest of the world one day in the very near future.

Maybe the best and wisest course is to move as soon as possible on three fronts, two of which are crucial to all inhabitants of this planet earth. The first is to stop further dumping in Somalia or, indeed, all other uninformed countries in this globe, needless to mention the illegal fishing and other immoral activities in Somalia. The second would be to start clean-up operations before it is too late. The third would be to assist the unfortunate Somalis or other similar victims of cancer. All these three fronts would each need proper research in order to reach efficient and desirable results.

Acknowledgement: I would like to thank the management and staff of the Red Crescent Hospital in Dubai for providing me with some vital data on Somali cancer patients. Similar thanks should go to Professor Abdulrahmen Aden Ibbi, then the Somali Minister for Fisheries and Marine Resources of the former Transitional National Government (TNG). The same goes to all Somali doctors and health personnel for their informal guidance, as well as to Dr R. M. Mousughi of Madison University, Gulfport, Louisiana, USA for supervising this paper.

REFERENCES

- BEIR Committee. The Effects on population of exposure to low levels of ionizing radiation. Third Report. Washington: National Academy of Sciences, 1980.
- Carazzolo, Barbara; Alberto Chiara and Luciano Scalettari. "Una Partita Truccata." *Famiglia Cristiana*, N8, 1998. Rome: Mar 4 1998. Web.
- . "E la Nave Va." *Famiglia Cristiana*, N13, 1998. Rome: Apr 8 1998. Web.
- Chiara, Alberto and Luciano Scalettari. "Il Traffico Che Uccide." *Famiglia Cristiana*, N47, 1998. Rome: Nov 29 1998. Web.
- Græger, Nina. "Environmental Security." *Journal of Peace Research*. Oslo: International Peace Research Institute 33 (1) 1996. Pp 109-116.
- Hassan, Zainab. "Seeking Environmental Justice: Hazardous Waste Dumping in Somalia." 10th Triennial SSIA Conference. 2007. Web. Aug 12 2009.
- "Italy Demands Inquiry on Toxic Waste Dumping in Somalia ." ." *Trade Environment Database (TED) Case Studies, Somali Waste Imports, CASE NUMBER: 64. Somalia Waste Imports from Ital.* European Information Service, Sept 12 + Oct 6 1992. Web.
- Lewis, I. M. *Modern History of Somalia*, rev. New York: Longman, 1980.
- Local Newspapers in Mogadishu include QARAN PRESS; XOGOGAAL; SAHAN; BANAADIR during 1997, 1998, 1999 and 2000.
- Markakis, John. *Resource Conflict in the Horn of Africa*. London: Sage Publications. 1998.
- Massari, Monica and Paola Monzini, Paola. (2004). "Dirty Businesses in Italy: A Case-study of Illegal Trafficking in Hazardous Waste." *Global Crime*. 6: 3 & 4, (2004): pp 285-304.
- Metz, Helen Chapin, ed. *Somalia.: A Country Study*. Washington: Library of Congress, 1992. Web. <http://countrystudies.us/somalia/>.
- Moeller, Dade W. *Environmental Health*, rev. Boston: Harvard Univ. Press, 1997.
- Mohamed, Abdullahi Elmi. "Somalia's Degrading Environment: Legal and Moral Perspectives of Deforestation and Hazardous Waste Dumping in Somalia." Mogadishu: Somali Centre for Water and Environment, 2001. <<http://www.somwe.com/Essay.html>>

- Murphy, Sean D. "Prospective Liability Regimes for the Transboundary Movement of Hazardous Wastes." *American Journal of International Law*. 87: 2. Washington, DC: 1994. pp. 24-75.
- Orlof, Kenneth and Henry Falk. "An International Perspective on Hazardous Waste Practices." *International Journal of Hygiene and Environmental Health*. Volume 206, Issues 4-5, (2003): pp 291-302.
- Poaletta, Michael. "Somalia Waste Imports from Europe and Civil War." *Trade Environment Database (TED) Case Studies: An Online Journal*. 2:1 (1993) "Somalia--64." Web.
- Poropat, Alessandra M., Jennifer Douglas and Shehu Ibrahim. "Nigeria Waste Imports From Italy." *Trade Environment Database (TED) Case Studies, Case Number: 52. Web*. Jan 1993. Web.
- "Toxic Waste Joins Somalia's List of Woes." *Chicago Tribune*, Sept 11, 1992.
- Tolba, Mustaba. Kamal. "Disposal of Hazardous Wastes in Somalia." United Nations Environment Programme (UNEP) Press Release, Statement by UNEP executive director, Sept 9 1992. pp 1-2.
- Tolba, Mostafa Kamal, Osmana A. Al-Kholy *et al.* *The World Environment: 1972-1992: Two Decades of Challenge*. UNEP. 1992.
- Von Ilseemann, Siegesmund. "Waffen aus der Atomfabrik." *Der Spiegel* 4/2001 (January 22) 2001. Pp 24-25 [Trans Max Sinclair, with Jared Israel and Peter Maher, "DU used in Somalia and Germany."] Web.
- UNEP. *Somalia: Post-conflict Environmental Assessment: Draft Country Profile*. Geneva, Switzerland: UNEP, 2003.
- UNEP Asian Tsunami Task Force. *After the Tsunami: Rapid Environmental Assessment*. Nairobi, Kenya: UNEP, 2005.
- UNEP. *Environmental Data Report: 1991-1992*. Nairobi, Kenya: UNEP, 1993 p.198.
- WCDE, 1987. *Our Common Future*. P2 -226.
- WHO (World Health Organization) *Who Global Infobase* 2009. <<https://apps.who.int/infobase/report.aspx?rid=153&iso=SOM&generateResults=Generate+Report>> Web 12 Aug 12 2009.

Table 1: Data from the Red Crescent Hospital in Dubai			
Number	Age	Sex. M=1 F=2	Cancer type
1	50	M	Liver malignant metastasis tumor
2	50	F	Squamous cell carcinoma of anus
3	70	F	Esophageal tumor below larynx
4	51	M	R/O cancer prostate (enlarged prostate gland)
5	60	F	Bladder tumor (carcinoma)
6	40	F	Skin tumor (dermatofibroma)
7	70	M	Bladder cancer
8	35	F	Thyroid tumor
9	60	M	Hepato cellular carcinoma in cirrhotic (liver)
10	38	F	Hepato cellular carcinoma
11	50	F	R/O soft tissue sarcoma of axillary
12	60	M	Chronic lymphatic leukemia and lymphadenopathy Generalized
13	70	M	Adenoma of the liver

Data from Charity Red Crescent hospital in Dubai (UAE). The data were from medical records of the hospital for eight months dealing with cancer patients.

TABLE 2: SUMMARY STATISTICS FOR AGE COLUMN	
Mean	54.15384615
Standard Error	3.345195855
Median	51
Mode	50
Standard Deviation	12.06127518
Sample Variance	145.474359
Kurtosis	-1.083602779
Skewness	-0.100345266
Range	35
Minimum	35
Maximum	70
Count	13

Analysis of the data using SPSS statistical package.

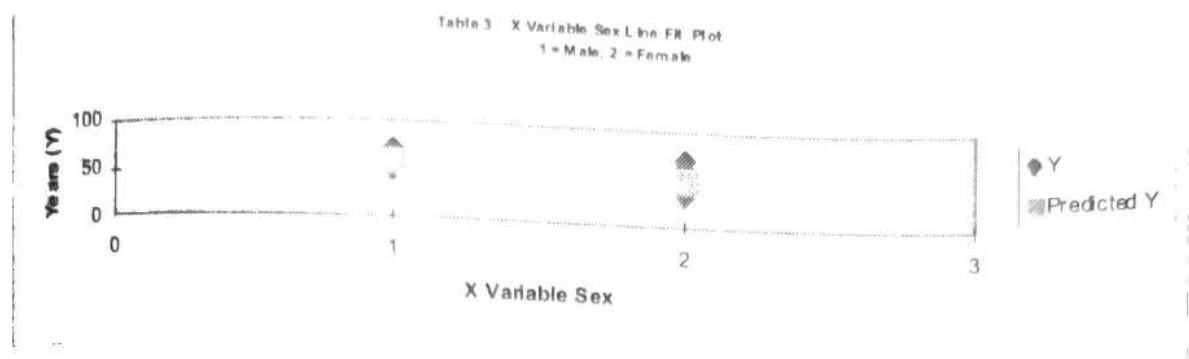


Table 3: line fit plot for adverse survivability impact for both sexes (Microsoft Excel)