

THE ONCOLOGY SERVICES IN SUDAN DURING THE MILITARY CONFLICT ,THE CHALLENGES

Dr. Ahmed Khalid

Associated Professor in clinical oncology (HU),
General manager of Khartoum oncology hospital
Radiation and Isotopes Centre Khartoum (RICK)

Sudan

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INTRODUCTION :

- Republic of **Sudan** is the second largest African country with area of *1.88 million square kilometer* crossroad between the north east Africa and the middle east
- surrounded by *8 countries* ,*Egypt to the north* ,*Eriteria and Ethiopia to the east* ,*chad to the west* ,*Libya to the south west* ,*central African republic to the southwest* and *south Sudan to the south*
- *Sudan* papulation is *49 million (2023)*
- The age group under *15 years* represent *21.79%*
And age group *15 – 64* represent *52.42%*
- Population growth *2.8%*



Sudan	
• Republic of Sudan (1985–2019)	6 April 1985
• Secession of South Sudan	9 July 2011
• Sudanese Revolution	19 December 2018
• 2019 Draft Constitutional Declaration effective	20 August 2019

	Area
• Total	1,886,068 km ² (728,215 sq mi) (15th)

	Population
• 2023 estimate	49,197,555 ^[17] (30th)
• Density	21.3/km ² (55.2/sq mi) (202nd)

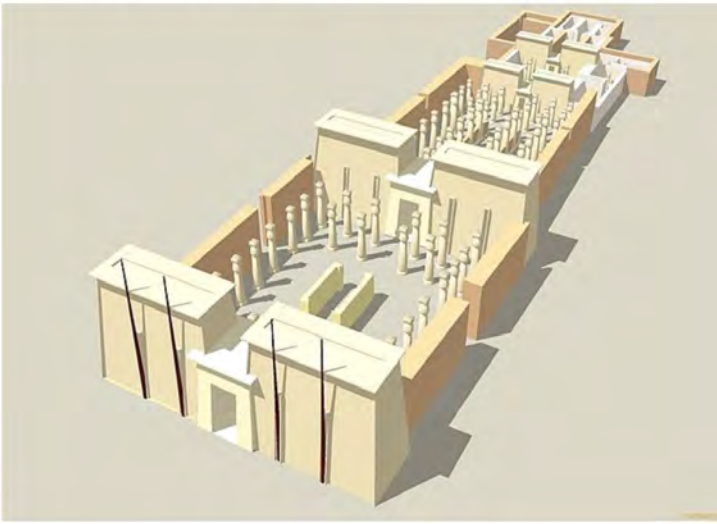
GDP (PPP)	2023 estimate
• Total	▼ \$172.651 billion ^[18] (71st)
• Per capita	▼ \$3,604 ^[18] (151st)

GDP (nominal)	2023 estimate
• Total	▼ \$25.569 billion ^[18] (96th)
• Per capita	▼ \$533 ^[18] (171st)

and largest city	
Capital-in-exile	Port Sudan ^[a]
Official languages	Arabic • English
Ethnic groups	70% Sudanese Arab ^[2] 5.5% Beja ^[3] 2.5% Nuba ^[4] 2% Fur ^[5] 2% Egyptian ^[6] 1.3% Nubian ^[b] 17.3% other ^[12]
Religion (2020) ^[14]	97% Sunni Islam ^[13] 1.5% Christianity 1.5% Traditional Faiths 0.9% Others
Demonym(s)	Sudanese 



The royal pyramids of Nuri



"Kushite Empire" redirects here. For the kingdom south of Egypt, see *Kingdom of Kush*.

The **Twenty-fifth Dynasty of Egypt** (notated **Dynasty XXV**, alternatively **25th Dynasty** or **Dynast 25**), also known as the **Nubian Dynasty**, the **Kushite Empire**, the **Black Pharaohs**,^{[2][3]} or the **Napatans**, after their capital **Napata**,^[4] was the last dynasty of the **Third Intermediate Period of Egypt** that occurred after the **Nubian** invasion.

Twenty-fifth Dynasty of Egypt

754 BC–656 BC



Statues of various rulers of the late 25th Dynasty–early Napatan period. From left to right: **Tantamani**, **Taharqa** (rear), **Senkamanisken**, again **Tantamani** (rear), **Aspelta**, **Anlamani**, again **Senkamanisken**; **Kerma Museum**.^[1]

Kingdom of Kush
Qes (Meroitic)^[1]

c. 780 BC – c. AD 350^[2]

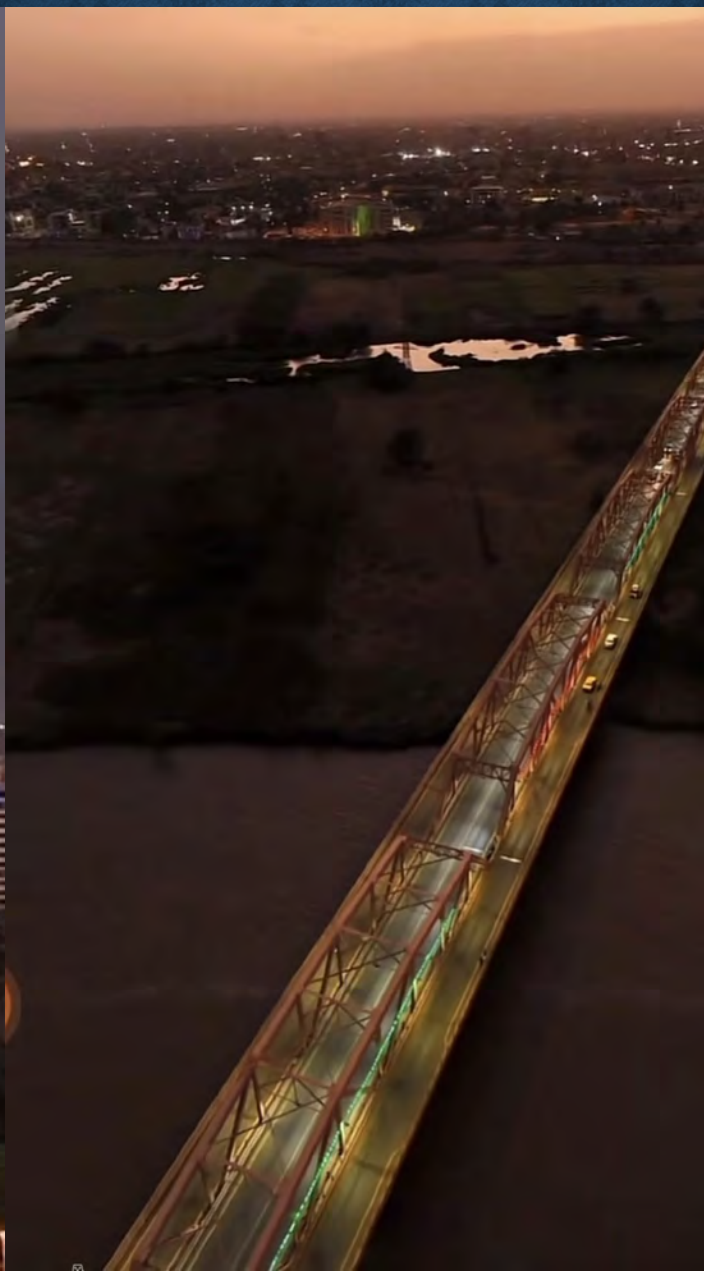


Kushite heartland, and Kushite Empire of the **Twenty-fifth Dynasty of Egypt**, circa 700 BC.^[3]

Capital	Kerma Napata Meroë
Common languages	Meroitic Egyptian ^[4] Blemmyan ^[5] Nubian languages
Religion	Kushite religion ^[6] Kushite polytheism Ancient Egyptian religion
Government	Monarchy
Monarch	
Historical era	Bronze Age to Late Antiquity
<ul style="list-style-type: none"> Established Capital moved to Meroe Disestablished 	<ul style="list-style-type: none"> c. 780 BC 591 BC c. AD 350^[2]



CANCER IN SUDAN BEFORE THE MILITARY CONFLICT :



RADIOTHERAPY CENTERS IN SUDAN :

- Also cancer is 3rd killer disease in Sudan (after malaria and infectious diseases)
- There is only 5 cancer's centers ,with radiotherapy machines and functioning nuclear medicine , and chemotherapy departments :

Governmental cancer's centers :

- 1.Khartoum oncology hospital ,radiation and isotopes center "RICK"
- 2.Gazira university cancer institute "NCI"
- 3.Shandi tumor therapy and researches center (STTRC)

private cancer's centers :

- 1.Marawe cancer center
- 2.Universal hospital (Khartoum)

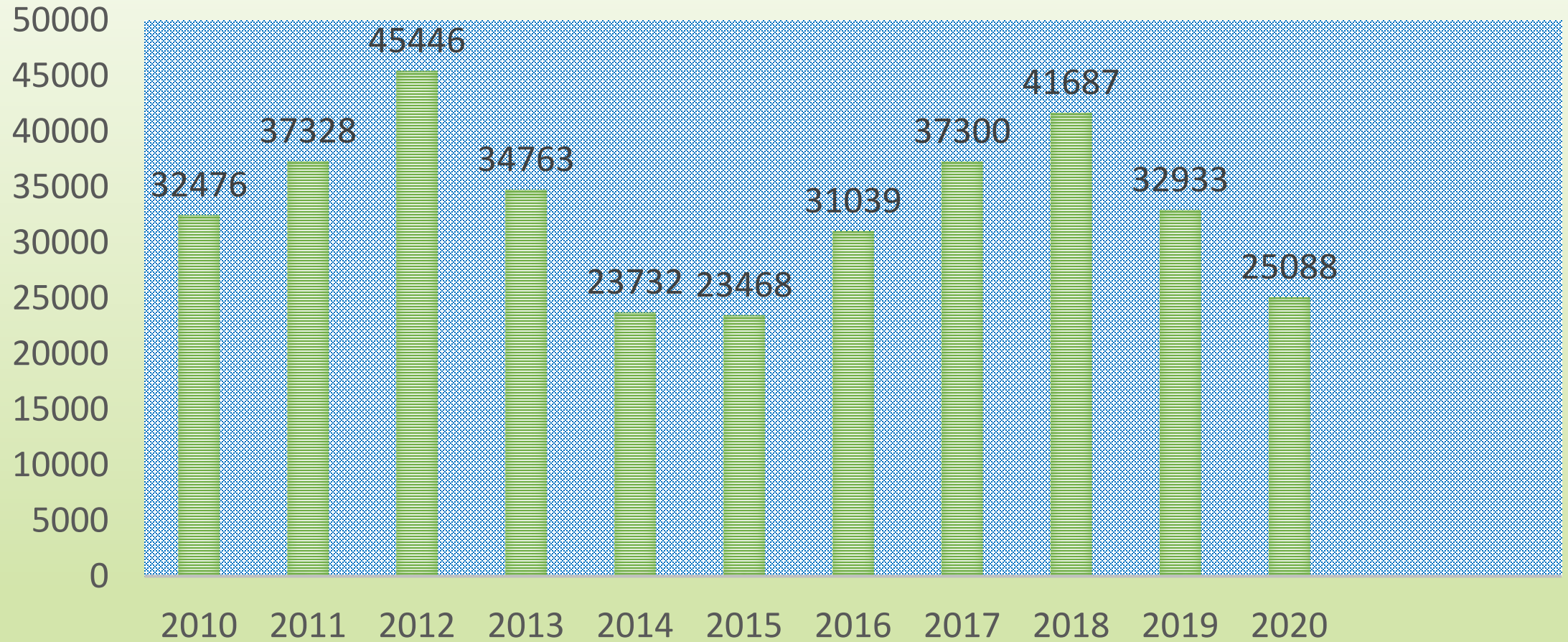


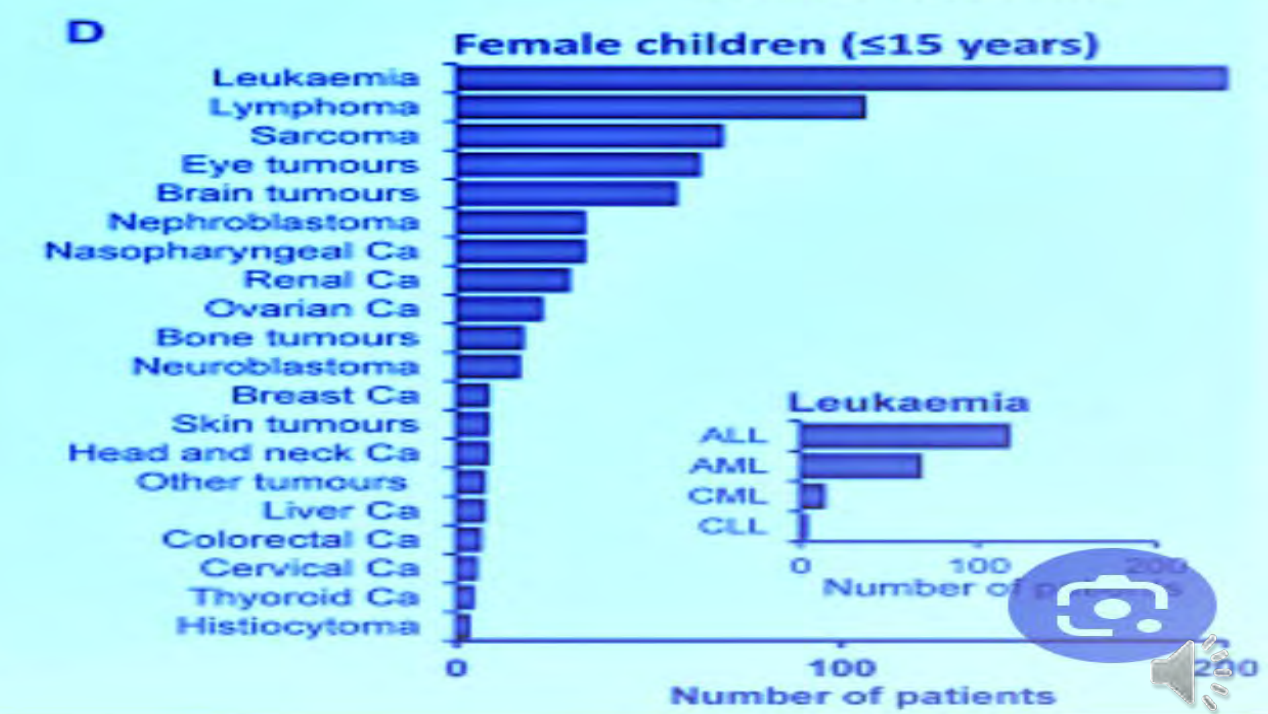
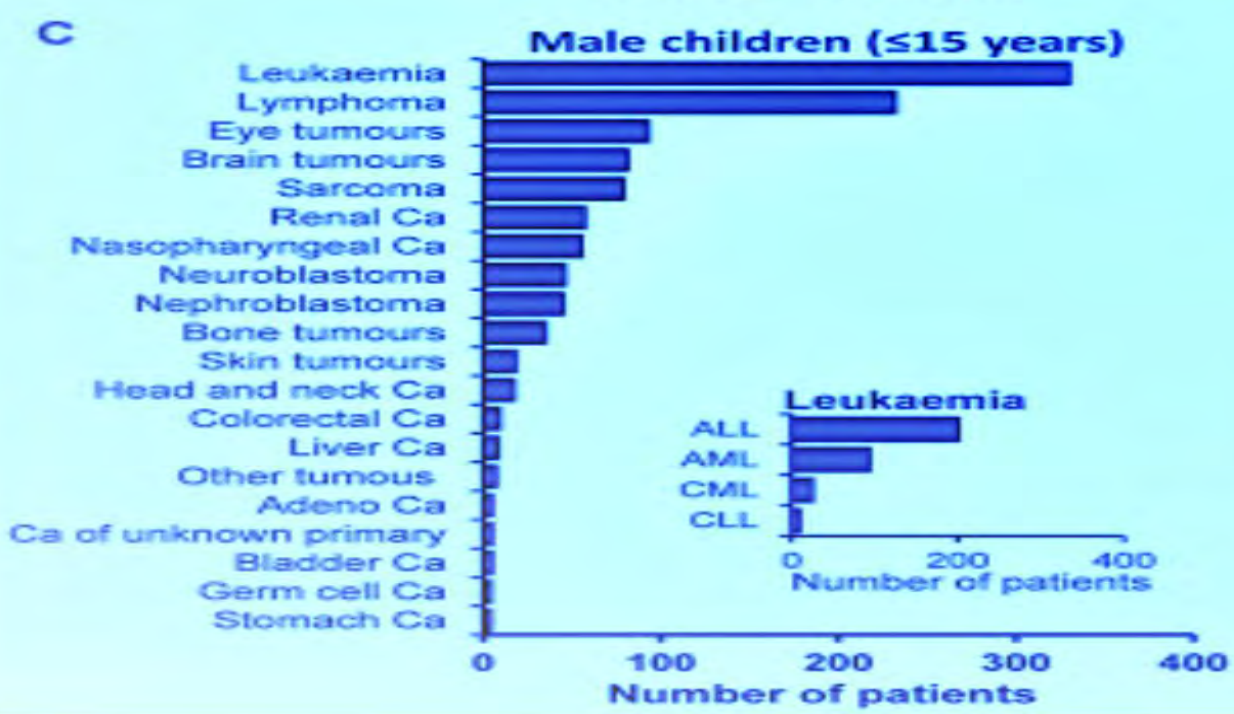
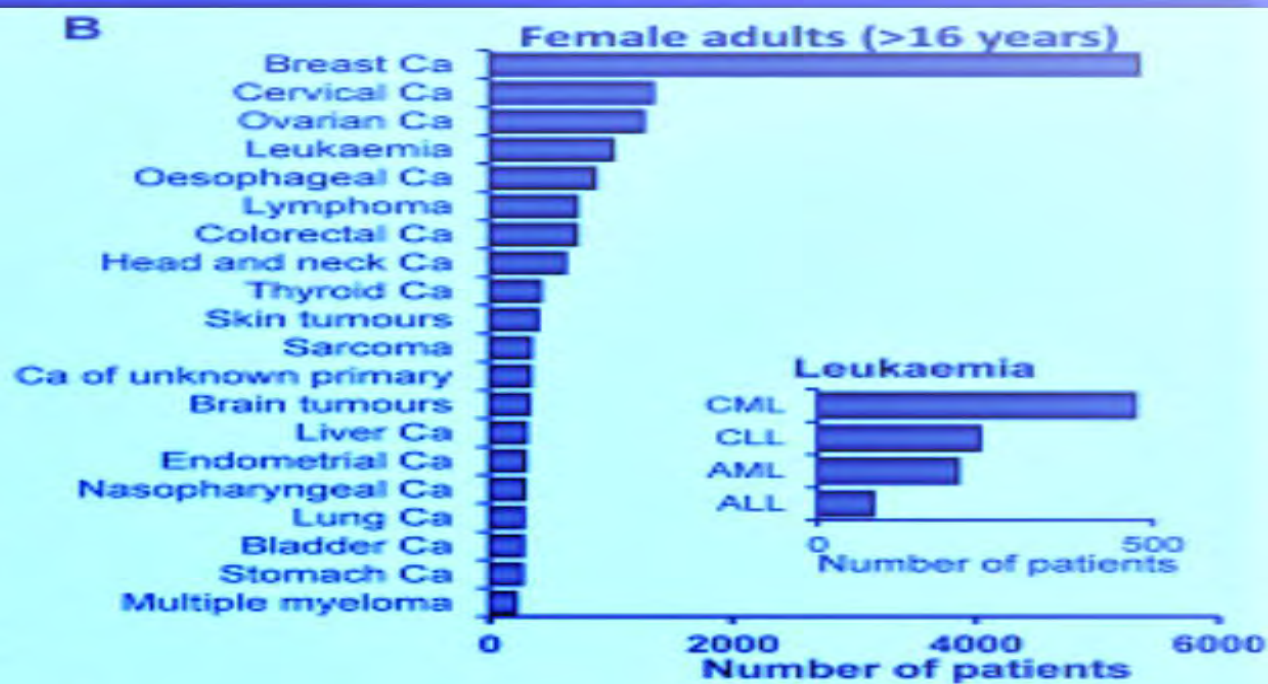
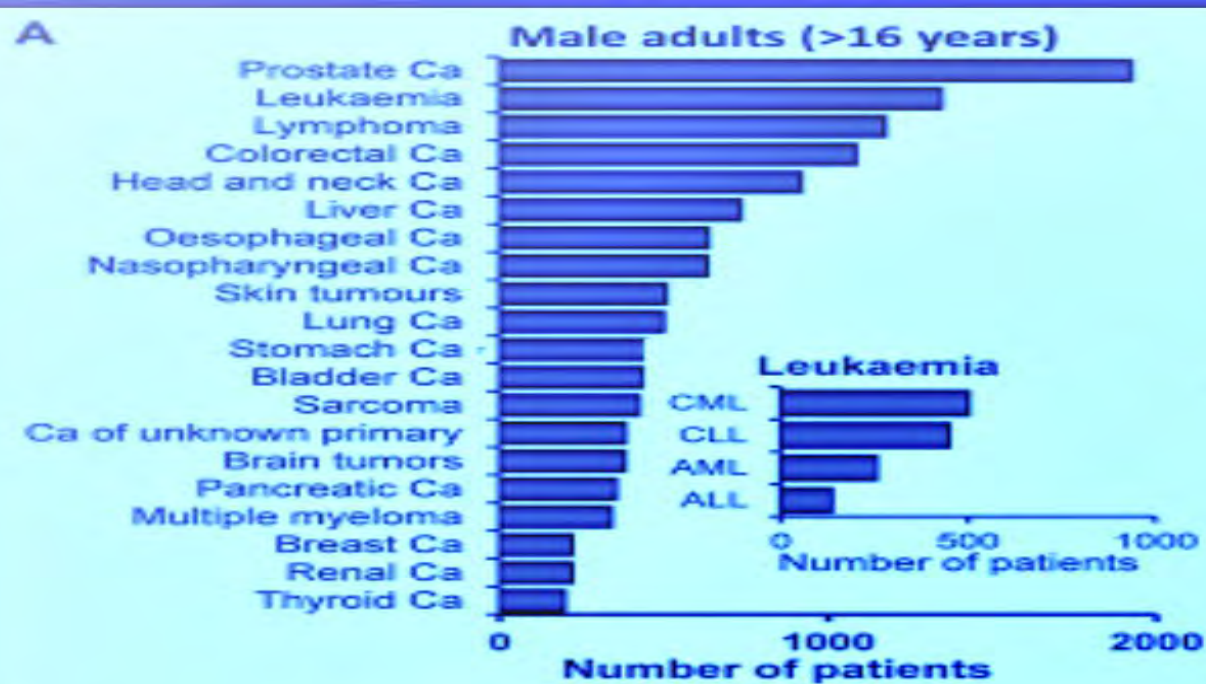
CANCER'S CENTERS IN SUDAN

Cancer's center	CO-60 machines	linear accelerators Machines	Conventional & CT simulator	HDR C0-60 Brachytherapy	Nuclear medicine
Khartoum Oncology Hospital ,radiation and isotopes cancer' "RICK"	2 functioning 1 not functioning (source decay)	1 functioning 1 not functioning	1 conventional 1 CT	1 not functioning (source decay)	1 spect gamma camera 1 spect –CT gamma camera
Gazira university National cancer's institute	2 functioning	1 not functioning	1 conventional	1 not functioning (source decay)	1 spect gamma camera
Shandi cancer's Centre	1 functioning	-	1 conventional	1 not functioning (source decay)	1 spect gamma camera



NO OF CANCER'S PATIENTS DURING THE PERIOD 2010 - 2020.(RICK)





CHALLENGES :

- Number of people devolving and dying from cancer is predicted to increase steadily in Sudan and in low and middle -income countries (world health organization (WHO))
- More than 70% of cancer's patients in Africa have no access to cancer treatment epically radiotherapy ,in Sudan only 1 MV radiotherapy machine per 4.5 million people .
- By the year 2030 , 80% of cancer deaths will be in low and middle -income countries (WHO) .
- The budget allocated for cancer treatment in Sudan is only about 5% from the recommended world' budget



RADIATION SAFETY AND NUCLEAR SECURITY :

- Sudan Minister of Science and Technology in 2010 ,established an independent Regulatory Body under the name “Sudanese Nuclear and Radiological Regulatory Authority (SNRRA)”,which has replaced the Radiation Protection Technical Committee (RPTC) established in 1996.
- The Board of SNRRA IS of 14 members from most stakeholders including the director of the Technical Office of the Regulatory Body



ROLE OF SNRRA :

- Expansion of a personal radiation monitoring system with equipments to cover more than 2000 workers.
- Establishment of protocols addressing the issues in systematic ways (optimization) requirements for licensing of medical radiological facilities and inspections .
- Provide experts in diagnostic radiology, nuclear medicine and radiotherapy to implement radiation protection programmes, and appropriately qualified medical and paramedical staff with appropriate radiation protection training.



ROLE OF SNRRA ;

- Establishment of a national committee for emergency preparedness and response with training of the staff members.
- Establishment of monitoring laboratories and radioactivity monitoring system



RADIATION SAFETY AND NUCLEAR SECURITY :

- In March 2023 ,the Office of Radiological Security (ORS) ,the united states Department of Energy(DOE)/ National Nuclear Security Administration (NNSA) program , together with ,Sudanese Nuclear and Radiological Regulatory Authority (SNRRA) ,and Khartoum oncology hospital ,radiation and isotopes center Khartoum (RICK) ,signed statement of work to protect radioactive sources and promotion of high activity radioactive sources with alternative technologies and implementation of highest standers of security and sustainability consistent with or above international guidelines .



CANCER'S CENTERS IN SUDAN DURING THE MILITARY CONFLICT:



AFP





*Children are suffer ,many
Forced to flee from their homes
Orphaned or separated from parents*



CANCER'S CENTERS IN SUDAN DURING THE MILITARY CONFLICT:

- Fighting erupted on 15 April 2023 ,started ,in the capital Khartoum between the Sudanese army and a paramilitary group known as the Rapid Support Forces (RSF) and this was the 3rd civil war in Sudan.
- The first civil war between the central government in Sudan and south region of Sudan Which led to independent of south Sudan in 2011,in which about 1.5 million People killed .
- The 2nd civil war was in Darfur ,the western region of Sudan, in which 200,000 people were killed and 2 million of people were displaced .
- The causes of all this civilian wars are political and disputes over the recourses.



CANCER'S CENTERS IN SUDAN DURING THE MILITARY CONFLICT:

- By January 2024 ,at least 15000 of people had been killed,40000 others were injured
- Over 10 million were internally displaced .
- more than 1.5 million were fled to the neighboring countries as refugees
- Thousands of this people are cancer's patients
- RICK ,the main governmental cancer's center ,in Khartoum ,was forcibly evacuated by the RFS's soldiers ,at the first days of the military conflict



CANCER'S CENTERS IN SUDAN DURING THE MILITARY CONFLICT:

- Hospitals and more than 100 medical facilities in Khartoum were went out of service ,from the first days of the military conflict .
- The UN office for the coordination of humanitarian affairs said that thousand oh children and adults were died because of shortages of medicine ,health care and food .
- The war's economic costs have surpasses all prior armed conflicts since Sudanese independent in 1956 .



CANCER'S CENTERS IN SUDAN DURING THE MILITARY CONFLICT:

- Sudan's cancer's centers were disintegrated under the weight of the fighting raging in the country .
- oncologist and health care providers are not able to provide the services to cancer's patients
- the military conflict threatens to become a humanitarian catastrophe as thousands of cancer's patients are not able to receive their specialized cancer's treatment in Khartoum ,the main and only governmental cancer' center in Khartoum the capital of Sudan and in Gazira university national cancer's center, which later on had also occupied by the militia of RFS .



CANCER'S CENTERS IN SUDAN DURING THE MILITARY CONFLICT:

- The megavoltage radiotherapy machines had been in a great dangerous when the area of cancer's center was under fire ,epically for CO - 60 machines .
- Many cancer's patients travelled to other cancer's centers in Sudan such as Gazira university national cancer's institute , about 180 kilometers south to Khartoum ,before the occupation, later by the militia of RSF
- other patients travelled to the neighboring countries ,such as Egypt and Sudia Arabia ,to receive the treatment .
- Medical services to cancer's patients have ceased by almost 90% .



THE HELPS OF WORLD'S COMMUNITIES

- While the military conflict in Sudan continue to spread ,humanitarian access especially for medicals helps is increasing
- intense violence and movement restrictions prevent the delivery of aids to health centers
- The humanitarian aids ,including medical aids were provided by many countries including USA,EU countries ,Arab countries and many international organizations such as :
- WHO
- UN 'refugee agency UNHCR
- EU humanitarian aids
- Red crest and others
- The UNHCR asked for \$ 4.1bn ,to meet the humanitarian needs in Sudan





“It is so easy to break down and destroy. **The heroes are those who make peace and build.**”

Nelson Mandela

*6th Annual Nelson Mandela Lecture,
Walter Sisulu Square, Kliptown,
Soweto, South Africa,
12 July 2008*

“There can be no peace until people have enough to eat... investments in agricultural research today can cultivate peace tomorrow... biotechnology is not the enemy, starvation is.”



Jimmy Carter

“WE FEEL THAT THERE’S A HUMAN RIGHT OF PEOPLE TO LIVE IN PEACE, WE FEEL IT’S A HUMAN RIGHT TO HAVE A MODICUM OF HEALTH CARE, TO HAVE A DECENT PLACE IN WHICH TO LIVE, TO HAVE A CHANCE TO HAVE AN EDUCATION, TO HAVE FREEDOM OF SPEECH AND FREEDOM OF RELIGION AND THE RIGHT TO ELECT YOUR OWN LEADERS”

JIMMY CARTER

