EPIDEMIOLOGY, BURDEN OF DISEASE, AND OUTCOMES OF HCC IN AFRICA

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CONFFERENCE ON LIVER DISEASE IN AFRICA
Cairo, Egypt. 6-8 September, 2019
Disclosures

• Nothing to disclose
HCC- WORLDWIDE

HCC is a disease of global public health significance, especially in Africa.

- New cases: 746,000 in 2012
- : 841,080 in 2018,
- accounting for 5% of all cancers in the world
- 6th most common Ca worldwide
- 5th in Males, 9th in Females.

New Global Cancer Data: GLOBOCAN 2018
Estimated age-standardized rates (World) of incidence cases, males, liver cancer, worldwide in 2012
**HCC- AFRICA**

**4TH MOST COMMON CA on the continent**

**PREVALENCE AND AETIOLOGICAL DIFFERENCES**

<table>
<thead>
<tr>
<th>NORTH AFRICA</th>
<th>SUB-SAHARAN AFRICA</th>
</tr>
</thead>
<tbody>
<tr>
<td>The leading CA in males in Egypt only.</td>
<td>2nd leading cancer for <em>men</em> and</td>
</tr>
<tr>
<td>Prevalence is low in the Maghreb-Libya, Algeria, Tunisia, Mauritania, Morocco</td>
<td>3rd for <em>women</em>.</td>
</tr>
</tbody>
</table>
### 25 Countries with the highest rates of liver cancer include

<table>
<thead>
<tr>
<th>12 AFRICAN COUNTRIES</th>
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</thead>
<tbody>
<tr>
<td>• Egypt, The Gambia</td>
</tr>
<tr>
<td>• Guinea, Ghana, Liberia,</td>
</tr>
<tr>
<td>• Burkina Faso, Senegal,</td>
</tr>
<tr>
<td>• Equitorial Guinea, Mozambique</td>
</tr>
<tr>
<td>• Cape Verde, and Guinea Bissau</td>
</tr>
</tbody>
</table>

Higher prevalence of HBV

Higher exposure to carcinogen such as tobacco and alcohol

Natural protective influences of estrogen against liver inflammation
AGE AT DIAGNOSIS

- Early age of onset in most African countries except Egypt

**EGYP**

58 yrs (IQR 53-63)  

**REST OF AFRICA**

46 yrs (IQR 36-58)

More advanced stages
RISK FACTORS (major)

• Despite diff in NAF and SSA: 1-4 risk factors Predominate

- HBV
- HCV
- Aflatoxin
- Iron overload
- Alcohol
- tobacco

INFLAMMATION

FIBROSIS
CIRRHOSIS
HCC
MAJOR RISK FACTORS
AFLATOXIN

Photograph by Pantong Mark

Figure 1

Distribution of HCC cases attributable to aflatoxin in different regions of the world.

IRON OVERLOAD

Total alcohol per capita (15+ years) consumption, in litres of pure alcohol, 2010

Per capita consumption (litres)

- <2.5
- 2.5-4.9
- 5.0-7.4
- 7.5-9.9
- 10.0-12.4
- ≥12.50

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Data Source: World Health Organization
Map Production: Health Statistics and Information Systems (HSI)
World Health Organization

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AFRICAN LIVER CANCER CONSORTIUM

AETIOLOGY

EGYPT
- HCV 84% (1054/1251)
- HBV 1%
- Other 12%
- Cirrhosis 100%

SSA
- HBV 55% (597/1082)
- HCV 6%
- Alcohol 13%
- Other 22%
- Cirrhosis 66%
EMERGING RISK FACTORS

- Combination of aggressive HBV genotypes and 1-4
- OBESITY
- TYPE 2 DM
- NAFLD
- HIV/HCV/HBV COINFECTION
- Result in earlier onset, more aggressive HCC phenotype


- NEW RISK FACTOR
- !!!!! Aristolochic acid: Has genotoxic properties responsible for Urothelial CA, same mutational fingerprint has been identified in a subset of HCC IN Taiwan, Korea, Japan, North America and Europe
- NO DATA IN AFRICA
- HERBAL CONCOCTIONS FREELY CONSUMED IN MOST OF AFRICA??
DISEASE BURDEN

Estimated age-standardized incidence rates (World) in 2018, liver, both sexes, all ages

ASR (World) per 100,000
- ≥ 8.4
- 5.8-8.4
- 4.7-5.8
- 3.3-4.7
- < 3.3
- Not applicable
- No data

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Data source: GLOBOCAN 2018
Graph production: IARC (http://gco.iarc.fr/today)
World Health Organization

INCIDENCE / MORTALITY APPROACHING UNITY
ECONOMIC BURDEN

AGE OF DIAGNOSIS...

<table>
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<th>EGYPT</th>
<th>REST OF AFRICA</th>
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<td>58 yrs (IQR 53-63)</td>
<td>46 yrs (IQR 36-58)</td>
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</table>

- VIBRANT WORK FORCE AFFECTED
  ESPECIALLY IN SSA

Therefore, decreased economic development

- High cost of diagnostic test where available
- High cost of drugs where available
- Lack of health insurance
- Majority pay out of pocket
## HCC IN AFRICA: ASIR, ASMR AND AGE-STANDARDIZED DALYs

<table>
<thead>
<tr>
<th>Region</th>
<th>Incident Cases, No (3 \times 10^3) (95% UI)</th>
<th>ASIR per 100 000, No. (95% UI)</th>
<th>Deaths, No. (x 10^3) (95% UI)</th>
<th>ASMR per 100 000, No. (95% UI)</th>
<th>DALYs (x 10^3) (95% UI)</th>
<th>Age-Standardized DALYs Rate per 100 000 (95% UI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>West SSA</td>
<td>29 (22-39)</td>
<td>16.9 (13.0-22.4)</td>
<td>31 (21-41)</td>
<td>18.1 (14.1- 23.4)</td>
<td>1055 (804-1422)</td>
<td>483.9 (372.3- 640.7)</td>
</tr>
<tr>
<td>Central SSA</td>
<td>7 (5-11)</td>
<td>16.9 (10.6-25.9)</td>
<td>8 (5-13)</td>
<td>19.9 (12.6-30.3)</td>
<td>234 (140-373)</td>
<td>460.1 (278.1- 723.4)</td>
</tr>
<tr>
<td>East SSA</td>
<td>17 (13-21)</td>
<td>10.3 (7.9-12.8)</td>
<td>19 (14-24)</td>
<td>11.9 (9.0-15.0)</td>
<td>575 (433-750)</td>
<td>306.3 (231.1-396.2)</td>
</tr>
<tr>
<td>Southern SSA</td>
<td>4 (3-5)</td>
<td>8.6 (7.0-10.6)</td>
<td>4 (4-5)</td>
<td>9.5 (7.9-11.4)</td>
<td>114 (94-145)</td>
<td>218.3 (180.6-272.1)</td>
</tr>
<tr>
<td>North Africa and Middle</td>
<td>21 (18-23)</td>
<td>6.3 (5.5-5.6)</td>
<td>24 (21-26)</td>
<td>7.1 (6.3-7.8)</td>
<td>616 (502-683)</td>
<td>159.3 (133.2-176.0)</td>
</tr>
<tr>
<td>East</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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OUTCOME

- OUTCOME IS ABYSMAL;
- HAS NOT CHANGED IN 5 DECADES
  

- KEW- 95 % MORTALITY IN 12 MONTHS

- YANG ET AL- OVERALL MEDIAN SURVIVAL 10.5 MONTHS - EGYPT

- 2.5 MONTH – REST OF AFRICA
Figure 3: Overall survival of patients with hepatocellular carcinoma in Africa
Fig. 2 | Global variation in the overall survival of patients with HCC. Taiwan and Japan have the best clinical outcomes for patients with hepatocellular carcinoma (HCC), probably owing to the high proportion of HCCs that are detected at an early stage as a result of nationwide intensive surveillance programmes in both countries. By contrast, outcomes in other East Asian countries are not as good as in Japan or Taiwan, as more patients present at an advanced stage. Overall survival of patients with HCC in Egypt was longer than in the other African countries, probably because more patients with HCC are diagnosed whilst under surveillance for HCC, so that a lower proportion of patients present with advanced- or terminal-stage disease and a higher proportion of patients receive HCC treatment. Data from Park et al. Global patterns of hepatocellular carcinoma management from diagnosis to death: the BRIDGE Study. Liver Int. 35, 2155–2166 (2015) and Yang et al. Characteristics, management, and outcomes of patients with hepatocellular carcinoma in Africa: a multicountry observational study from the Africa Liver Cancer Consortium. Lancet Gastroenterol. Hepatol. 2, 103–111 (2017).
INCIDENCE/ MORTALITY OF HCC IN AFRICA

Estimated age-standardized incidence and mortality rates (World) in 2018, ages 0-74

Data source: Giemen 2018
Graph production: Global Cancer Observatory (http://gco.iarc.fr)
MORTALITY RATE

Estimated age-standardized mortality rates (World) in 2018, liver, both sexes, all ages

ASR (World) per 100 000
≥ 9.8
6.1–9.8
5.0–6.1
3.3–5.0
< 3.3

Not applicable
No data

Data source: GLOBOCAN 2018
Graph production: IARC
[http://gco.iarc.fr/itoday]
World Health Organization

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Estimated number of deaths from 2018 to 2040, liver, both sexes, all ages

- **Africa**: Increase by 2040
- **Northern Africa**: Increase by 2040
- **Western Africa**: Increase by 2040
- **Eastern Africa**: Increase by 2040
- **Middle Africa**: Increase by 2040
- **Southern Africa**: Increase by 2040

**Data source:** Globocan 2018
**Graph production:** Global Cancer Observatory (http://gco.iarc.fr/)
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SUMMARY

EPIDEMIOLOGY

High Prevalence
Major Risk Factors
Emerging Risk Factors
Earlier Age Onset

BURDEN OF DISEASE

• High Incidence/ mortality despite obvious underestimation
• Heavy economic burden on the state / individuals

OUTCOME

• Incidence/ mortality almost unity
• No change over 5 decades
• Projection to 2040
THANK YOU