BODY MASS INDEX AND THE RISK OF SERIOUS NON-AIDS EVENTS (SNAEs)

Background

- Increasing prevalence of being overweight or obese in the treated HIV-positive population (>50% in some settings) is possibly driven by antiretroviral therapy (ART) and life-style factors.

- High body mass index (BMI) (weight (kg)/ height(m²)) in the general population has been associated with a range of adverse outcomes.

- On the other hand, low BMI/ being underweight is also associated with adverse outcomes, including mortality.

- In HIV-positive individuals, high BMI has been associated with the risk of diabetes.

- A detailed assessment of how BMI affects the risk of individual serious non-AIDS events (SNAEs) in HIV-positive individuals will help provide key data to clinicians and the patient community in optimizing management of this important modifiable risk factor.
Methods

Inclusion: D:A:D study participant → on ART → at least one BMI measurement available on/after ART initiation (baseline) → at least one year of further follow-up from study entry.
  • Individuals with prior CVD, diabetes or cancer were excluded

Endpoints: Diabetes; cardiovascular disease (CVD) (composite of myocardial infarction/stroke/invasive cardiovascular procedures); non-AIDS-defining cancers (NADC); BMI-related NADCs (composite of cancers known to be associated with BMI in the general population: esophagus, pancreas, colon, rectum, breast, endometrium, kidney, thyroid and gallbladder); and all-cause mortality.

Statistics:
  • BMI was time-updated lagged by 1 year (any BMI measurement being linked to an event precedes the given event by at least 1 year.
  • Poisson regression models were used adjusted for key respective confounders for each outcome.
Results

- 41,149 individuals with 295,147 person-years of follow-up (PYFU).
- Largely male (73%) with baseline mean age of 40 years and baseline median BMI of 23.3 (IQR: 21.2-25.7). The median (IQR) time-gap between BMI measurements was 6 (4-9) months.
- Smoking appeared to be inversely related to the baseline BMI category.

Table: Number of SNAEs events and incidence rate per 1000 PYFU by BMI category

<table>
<thead>
<tr>
<th>Latest BMI (kg/m²) category</th>
<th>&lt;18.5</th>
<th>18.5-23</th>
<th>23-25</th>
<th>25-27.5</th>
<th>27.5-30</th>
<th>&gt;30</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVD</td>
<td></td>
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<tr>
<td>97 (6.7)</td>
<td>578 (4.8)</td>
<td>298 (4.6)</td>
<td>242 (4.8)</td>
<td>96 (4.4)</td>
<td>87 (4.9)</td>
<td>1398 (4.8)</td>
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<td>Diabetes</td>
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<td>33 (2.3)</td>
<td>248 (2)</td>
<td>253 (4)</td>
<td>280 (5.6)</td>
<td>184 (8.5)</td>
<td>209 (12.2)</td>
<td>1207 (4.2)</td>
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<td>NADC</td>
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<tr>
<td>95 (7.9)</td>
<td>510 (5.1)</td>
<td>223 (4)</td>
<td>167 (3.8)</td>
<td>82 (4.2)</td>
<td>66 (4.1)</td>
<td>1143 (3.9)</td>
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<tr>
<td>BMI-related NADC</td>
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<td>12 (1)</td>
<td>75 (0.8)</td>
<td>32 (0.6)</td>
<td>31 (0.7)</td>
<td>13 (0.7)</td>
<td>21 (1.3)</td>
<td>184 (0.6)</td>
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<tr>
<td>All-cause mortality - males</td>
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<td>260 (33.2)</td>
<td>1138 (13)</td>
<td>443 (8.4)</td>
<td>333 (8.1)</td>
<td>142 (8.7)</td>
<td>102 (10)</td>
<td>2418 (11.2)</td>
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<td>All-cause mortality females</td>
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<tr>
<td>116 (16.7)</td>
<td>256 (7.4)</td>
<td>94 (7.2)</td>
<td>66 (6.2)</td>
<td>33 (5.4)</td>
<td>42 (5.3)</td>
<td>607 (7.6)</td>
<td></td>
</tr>
</tbody>
</table>
Results

Relative risk of each SNAE according to BMI

*Model B additionally adjusted for time-updated lipids, blood pressure and incident diabetes
Results
Relative risk of each SNAE according to BMI

Fig 1c: Cancers
- All NADC
- BMI-related NADC

Fig 1d: All-cause mortality
- Males
- Females
Conclusions

• Low BMI preceding an event by at least 1-2 years was associated with an increased risk of CVD, cancers and all-cause mortality.
  • Residual confounding by smoking can not be excluded

• Risk of SNAEs (except diabetes) only start to increase at very high levels of BMI (>30), with minimal increased risk even at BMIs of 25-30.

• Data are limited by fewer study participants at extreme BMI levels, especially >30. Also limitations of BMI as a marker of body weight/fat.

• Future work should evaluate optimum BMI in the HIV-positive population and assess how short term and long term changes in BMI relate to the risk of SNAEs.
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