Hazardous Alcohol Use and Lung Damage in People With HIV and TB

761

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BACKGROUND

- Tuberculosis (TB) causes 1/3 of all HIV-related deaths and is a major driver of morbidity among people with HIV (PWH).
- Alcohol use is common in PWH and increases the risk for TB disease and poorer treatment outcomes.
- We examined whether hazardous alcohol use is associated with structural and functional indices of lung damage in PWH at TB treatment initiation.
- We hypothesized that hazardous alcohol use is associated with worse TB-related lung damage, function, and respiratory symptoms at baseline.

METHODS

- PWH initiating TB treatment in Mbarara-Uganda.
- Alcohol use assessed using Alcohol Use Disorders Identification Test (AUDIT) into none [0], non-hazardous [1-7] and hazardous [≥8]).
- Baseline assessments included;
  - ➢ Spirometry (FEV1, FVC, FEV1/FVC ratio)
  - ➢ High Resolution Chest CT scan; acute restrictive pattern (consolidation & ground glass opacities), acute obstructive pattern (bronchiolitis & tree-in-bud opacities) and chronic features (fibrosis, cavitation, bronchiectasis & calcified nodules).
  - ➢ Respiratory symptoms (St. George's Respiratory Questionnaire, SQRQ); total, symptom, activity and impact scores.
  - ➢ 6-minute walk distance.
- Multivariable regression adjusted for age, sex, prior TB, history of ART use, history of incarceration and CD4 count to estimate association of hazardous alcohol use at treatment initiation with structural & functional lung damage.

Heavy alcohol use is common among people with HIV and TB and is closely linked to smoking.

RESULTS

Table 1. Baseline characteristics of study participants, stratified by AUDIT score (n = 198)

Characteristics	Overall (n=198)	AUDIT=0; n=73 (37%)	AUDIT=1-7; n=41 (21%)	AUDIT≥8; n=84 (42%)	P-value
Age; Mean (Std Dev)	37 (11)	37 (10)	36 (13)	38 (11)	0.38
Male sex	104 (53%)	24 (33%)	21 (51%)	59 (70%)	**<0.001**
BMI; Mean (Std Dev)	20 (4)	20 (4)	21 (4)	19 (3)	0.03
Current or Previous Daily Smoker	44 (22%)	5 (7%)	7 (17%)	32 (38%)	**<0.001**
Secondhand Smoke Exposure	103 (52%)	17 (23%)	17 (42%)	69 (82%)	**<0.001**
CD4 cell count; Mean (Std Dev)	266 (262)	225 (264)	342 (291)	264 (240)	**0.019**
Currently taking ART	109 (55%)	35 (48%)	23 (56%)	51 (61%)	0.273
AUDIT score; Mean (Std Dev)	9 (10)	0 (0)	3 (2)	19 (7)	**<0.001**
6-minute walk distance; Mean (Std Dev)	373 (90)	369 (84)	369 (97)	378 (92)	0.782
FEV1 (%Pred); Mean (Std Dev)	80 (25)	81 (21)	77 (29)	80 (26)	0.952
FVC (%Pred); Mean (Std Dev)	90 (23)	86 (20)	88 (27)	94 (24)	0.23
FEV1/FVC ratio; Mean (Std Dev)	0.74 (0.15)	0.79 (0.10)	0.72 (0.16)	0.71 (0.17)	**0.035**
Obstructive pattern (FEV1/FVC ratio <70%)	39 (27%)	7 (14%)	9 (36%)	23 (34%)	**0.024**
SGRQ total score; Mean (Std Dev)	37 (26)	31 (25)	39 (26)	40 (26)	0.082
SGRQ symptom score; Mean (Std Dev)	37 (25)	33 (26)	38 (27)	41 (24)	0.135
SGRQ activity score; Mean (Std Dev)	39 (31)	34 (31)	43 (31)	41 (31)	0.269
SGRQ impacts score; Mean (Std Dev)	35 (27)	29 (26)	37 (27)	39 (28)	**0.044**
Abnormal lung CT findings	110 (61%)	32 (49%)	23 (64%)	55 (69%)	0.052
CT–Acute Obstructive Category	31 (17%)	7 (11%)	8 (22%)	16 (20%)	0.073
CT–Acute Restrictive Category	68 (38%)	20 (31%)	14 (39%)	34 (43%)	0.105
CT–Chronic Category	61 (34%)	14 (22%)	15 (42%)	32 (40%)	**0.045**

Fig 1. Forest plot of adjusted associations with FEV1/FVC ratio

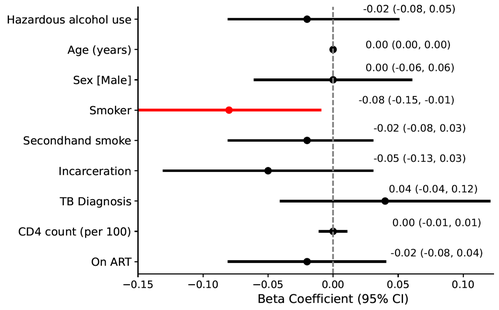
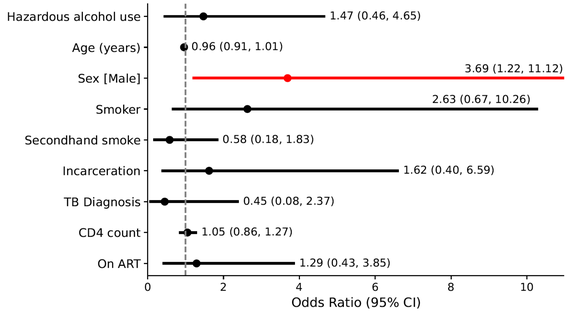


Fig 2. Forest plot of adjusted associations with bronchiolar disease



LIMITATIONS

- Alcohol use was self-reported which limits reliability. Objective measures like phosphatidylethanol (PEth) should be explored for future studies.

SUMMARY AND FUTURE DIRECTIONS

- Hazardous alcohol use was common among PWH initiating TB treatment.
- PWH with hazardous alcohol use were more likely to be male, smokers, had lower BMI, lower CD4 count, had more abnormal lung CT findings, poorer respiratory function and worse respiratory symptoms at baseline.
- After adjusting for confounders, cigarette smoking and male sex rather than hazardous alcohol use were independently associated with obstructive structural and functional lung impairment.
- Hazardous alcohol use clusters with smoking and male sex and its effects maybe synergistic rather than direct.
- Future work will explore whether hazardous alcohol use affects lung healing in PWH treated for TB.

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PROJECT LEADS: Dr. Kaku So-Armah (PhD) & Dr. Winnie Muyindike.