Cardiometabolic Risk Profile of Patients With Metabolic Dysfunction-Associated Steatohepatitis in England: A Real-World Cohort Study

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INTRODUCTION

- Metabolic dysfunction-associated steatohepatitis (MASH) is a progressive liver disease associated with increased risks of both liver-related and cardiovascular complications.[1-8]
- Cardiometabolic risk factors such as obesity, type 2 diabetes mellitus (T2DM), hypertension, and cardiovascular disease (CVD) are common among patients with MASH and may contribute to disease progression and adverse clinical outcomes.
- Characterizing the cardiometabolic profile of patients with MASH may help identify opportunities for earlier intervention and more comprehensive disease management.

OBJECTIVE

- To characterize the cardiometabolic risk profile and relevant comorbidity treatments of patients with MASH in England using linked real-world healthcare data.

METHODS

- Retrospective cohort study using Clinical Practice Research Datalink (CPRD) Aurum primary care electronic health records linked to Hospital Episode Statistics (HES) secondary care reimbursement and Office for National Statistics mortality data.
- Adults diagnosed with MASH (as recorded in CPRD or HES) between 2011 and 2020 were included.
- Patients with advanced liver disease before or within 90 days of MASH diagnosis were excluded.
- Cardiometabolic risk factors and treatments were assessed at a landmark date defined as 90 days after the earliest recorded MASH diagnosis.
- While not directly measured in the study population, the proportion of patients with ≥2 or ≥3 cardiometabolic risk factors (obesity, impaired glucose regulation, hypertension, and dyslipidemia) was estimated using Fréchet-type bounding methods, which estimated the minimum possible overlap between risk factors.

RESULTS

Study Population:

- A total of 2,696 patients with MASH were included (mean [SD] age, 56.4 [15.0] years; mean follow-up, 4 years) (**Table 1**).
- The cohort was predominantly female (54.5%) and White (83.7%) (**Table 1**).

Prevalence of Cardiometabolic Comorbidities:

- Hypertension (47.3%), obesity (44.7%), and T2DM (40.9%) were the most prevalent cardiometabolic comorbidities (**Figure 1**).
- CVD and metabolic syndrome were present in 19.2% and 16.6% of patients, respectively.

Co-occurrence of Cardiometabolic Risk Factors:

- Among patients with T2DM, a substantial burden of additional cardiometabolic disease was observed, with obesity (56.2%) and hypertension (63.2%) being particularly common; more than one-quarter had established CVD (27.0%), and more than one-third met criteria for metabolic syndrome (37.2%) (**Figure 1**).
- Among patients with overweight or obesity, approximately half had T2DM (50.0%) and hypertension (52.7%), and CVD (20.3%) and metabolic syndrome (26.8%) were also common.
- Patients with CVD had a substantial burden of additional cardiometabolic comorbidities, including hypertension (66.7%), T2DM (57.6%), obesity (46.2%), metabolic syndrome (25.1%), and chronic kidney disease (21.5%).
- Overall, 40.9% of patients were estimated to have ≥2 cardiometabolic risk factors and 38.9% were estimated to have ≥3 risk factors.

Cardiovascular Risk Profile:

- Mean (SD) low-density lipoprotein cholesterol was 106.7 (41.8) mg/dL and mean (SD) QRISK3 score among patients without existing CVD was 20.9 (17.2), consistent with elevated predicted cardiovascular risk (**Table 1**).

Treatment Patterns:

- Approximately half of patients received statin therapy (49.1%; n=1,324), while 62.3% (n=1,680) received antihypertensive treatment (**Table 1**).
- Among patients with diabetes, use of glucagon-like peptide-1 (GLP-1) receptor agonists (12.5%; n=159) and sodium-glucose cotransporter-2 inhibitors (SGLT-2) (8.9%; n=113) was limited.

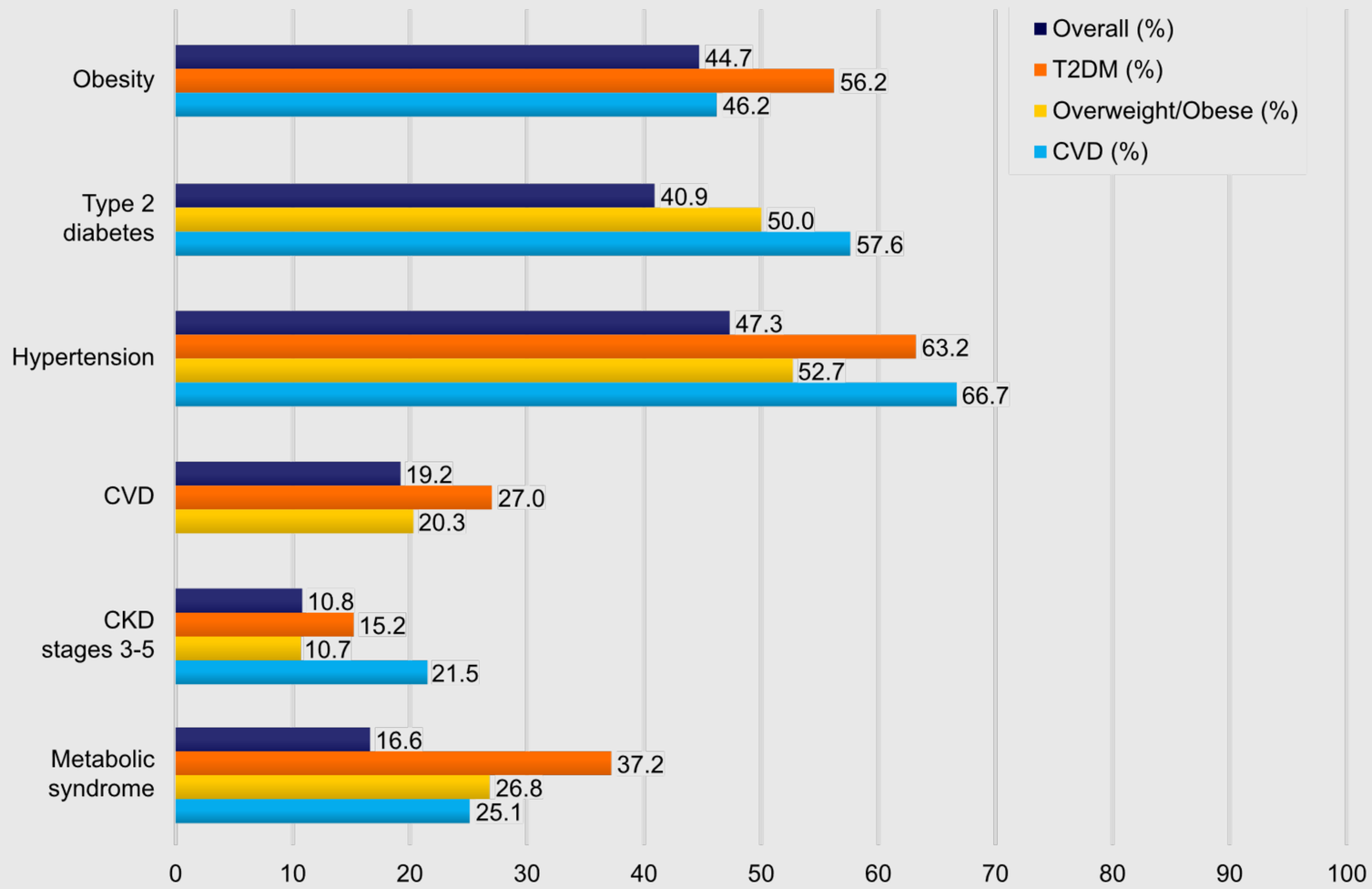
RESULTS

TABLE 1. Baseline Demographic and Cardiometabolic Characteristics of Patients With MASH in England

Characteristic	Overall (N=2,696)	T2DM Subgroup (n=1,104)	Overweight/Obese Subgroup (n=1,667)	CVD Subgroup (n=517)
Demographics				
Age (years), mean (SD)	56.4 (15.0)	59.5 (13.7)	56.2 (14.1)	65.9 (12.9)
Female, n (%)	1,468 (54.5)	633 (57.3)	924 (55.4)	263 (50.9)
White, n (%)	2,256 (83.7)	899 (81.4)	1,414 (84.8)	444 (85.9)
Follow-up time per patient in months, mean (SD)	52 (32.5)	49.2 (30.4)	51.1 (31.5)	44.4 (30)
LDL cholesterol, mean (SD)	2.76 (1.08)	2.38 (1.07)	2.69 (1.08)	2.44 (1.05)
QRISK3 score, mean (SD)	20.9 (17.2)	30.7 (17.7)	22.1 (17)	NA
Treatment, n (%)				
Statin use	1,324 (49.1)	836 (75.7)	901 (54.0)	433 (83.8)
Antihypertensive use	1,680 (62.3)	854 (77.4)	1,116 (66.9)	472 (91.3)
Diabetes medications (Type 1 or 2)[a], n (%)				
SGLT-2	113 (8.9)	113 (10.2)	92 (9.9)	28 (8.6)
GLP-1 RA	159 (12.5)	159 (14.4)	135 (14.5)	46 (14.1)

Abbreviations: CVD = cardiovascular disease; GLP-1 RA = glucagon-like peptide-1 receptor agonist; LDL = low-density lipoprotein; MASH = metabolic dysfunction-associated steatohepatitis; SGLT-2 = sodium-glucose cotransporter 2; T2DM = type 2 diabetes mellitus
[a]Among those with any evidence of diabetes

FIGURE 1. Prevalence of Cardiometabolic Comorbidities Among Patients With MASH and Key Cardiometabolic Subgroups



Abbreviations: CKD = chronic kidney disease; CVD = cardiovascular disease; MASH = metabolic dysfunction-associated steatohepatitis; T2DM = type 2 diabetes mellitus

LIMITATIONS

- MASH is underdiagnosed; therefore, the patients included here may represent those more likely to be in regular contact with healthcare services and to undergo more frequent health assessments, which may affect the accuracy of comorbidity prevalence estimates.
- Within the data sources used, a lack of recorded diagnoses was assumed to represent the absence of the condition, and underrecording cannot be directly determined.
- In addition to recorded diagnoses, overweight and obesity identification require height and weight or direct BMI recording within the CPRD data.

CONCLUSION

- **Patients with MASH in England exhibit a substantial burden of cardiometabolic disease and elevated cardiovascular risk.**
- **Cardiometabolic risk factors frequently clustered, particularly among patients with T2DM and established CVD.**
- **More than half of patients with CVD also had T2DM, and two-thirds had hypertension, underscoring the close relationship between hepatic, metabolic, and cardiovascular disease.**
- **Despite this high-risk profile, use of GLP-1 receptor agonists and SGLT-2 inhibitors was low.**
- **These findings suggest opportunities for improved cardiometabolic risk assessment and management in patients with MASH.**

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