Retrospective review of bone health status, management and treatment of low Bone Mineral Density of the Cystic Fibrosis population in Cork University Hospital

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INTRODUCTION

Due to improvements in the clinical care of people with Cystic Fibrosis (PWCF), there is an increased expected survival, which has led to an increase in the prevalence of long-term complications(1).

Adults with CF have many risk factors for **reduced Bone Mineral Density (BMD)** including:

Inflammation	Malnutrition	↓ Physical activity	CFTR dysfunction	Cystic Fibrosis Related Diabetes (CFRD)	Steroid Use

OBJECTIVES

The objective of this study was to consolidate all bone health data so that it may be analysed to improve delivery of bone health care given to adults attending the Cystic Fibrosis (CF) unit in Cork University Hospital (CUH)

The **primary aims** were:
1. Determine the prevalence of reduced BMD
2. Assess risk factors for low BMD
3. Compare current practice to CF guidelines

METHODS

Clinical and pathological data was collected by a retrospective chart review including:

- Patient demographics
- Biochemistry results
- Medications
- Anthropometry
- Pancreatic status
- Presence or absence of CFRD
- Results of Dual energy x-ray absorptiometry (DXA) scans

All information gathered was recorded in **Excel datasheets**
Statistical analysis was undertaken using **SPSS**.
Pearson's Chi-square and Spearman's rho correlation co-efficient were used to investigate if there were correlations between non-parametric continuous data. P-value less than 0.05 was considered significant.

RESULTS & DISCUSSION

	Age Median (IQR)	BMI Median (IQR)	F508 homozygous (%)	F508 heterozygous (%)	CFRD (%)	Pancreatic insufficient (%)	Meeting exercise recommendations (%)	Vitamin D <75 nmol/L (%)	Moderately reduced BMD (%)	CF related low BMD (%)
Male N= 109	30 (24.5, 37.0)	23.9 (22.2, 25.9)	53.2	37.6	30.3	89	62.4	56.0	35.9	11.7
Female N= 73	30 (24.5, 37.0)	22.5 (20.5, 25.4)	54.8	41.1	24.7	79.5	67.1	53.7	36.4	19.7
Total N=189	31 (24.0, 37.0)	23.5 (21.5, 25.9)	53.8	39	28	85.2	64.3	55.0	36.1	14.8

Risk factors associated with BMD:
The prevalence of CF related low BMD was significantly higher in patients with **CFRD** and those taking **oral steroids**
There was also a small but significant relationship with BMD, **age (P = 0.005, rho = -0.215)** and minutes of **exercise (p= 0.024, rho = 0.174** per week.

- • **Moderately reduced** : Z-score between -1 and -1.9 T-score between -1 and -2
- • **CF related low BMD:** Z-score ≤ -2 T-score ≤ -2.5

- The **current aim of practice** in CUH is for all adults to have **DXA scans every two years** however, only **26.9%** of patients had their most recent DXA scan completed within the last two years compared with 48.1% prior to the covid pandemic.
- The **European Cystic Fibrosis Society (ECFS)** recommends that the frequency of DXA scans should be based on the **current bone health status** of the patient (2).

CONCLUSION

- Our findings reported a **lower prevalence** of reduced BMD than other studies which is likely due to improvements in the care of people with CF.

- **Optimising glycaemic control** in patients with CF may help in the management of bone health. It appears that blood glucose control can affect BMD in PWCF (4).

- If CUH implemented the ECFS guidelines in practice, 83 patients **(49.1%)** would only need to be scanned **every 5 years**, as they have normal BMD, which would provide more availability for those with a lower BMD to be re-assessed more regularly.

- Further research into the impact of **CFTR modulators** on CF related bone disease will be of value.

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