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Regional variation in early diagnosis, multimorbidity and death in English males and females of different ethnicity with incident lung cancer from 2014-2019

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Background: Regional variation in treatment and outcomes of lung cancer (LC) exists in England suggesting a need for more effective and personalised disease management. However, population level data on patterns of multimorbidity (MM) at diagnosis (Dx), early Dx and mortality in LC across English regions by gender and ethnicity is scarce.

Methods: From the National Cancer Registration Dataset 235208 people aged > 15 years (53% male) with incident LC (2014-2019) across 21 Cancer Alliances (CA) were analysed by gender and in White, Black and South Asian (SA) ethnicities. Regional variation in the proportion with early Dx (Stage I/II), MM (Charlson Index ≥ 1) and 1-year crude mortality rate / 100 person years (PY) was estimated. Average Percent Change (APC; %) was estimated to assess temporal changes.

Results: The proportion of Early Dx was low but increased over time with regional variation in males (24 to 28%; APC mean (min, max): 2.8 (0.4, 7.5%)), females (28 to 34%; APC mean (min, max): 4.0 (1.2, 8.6%)), White (26 to 31%; APC mean (min, max): 3.6 (1.5, 7.3%)), Black (23 to 31%; APC mean (min, max): 6.3 (1.1, 10.1%)), and SA ethnicities (25 to 31%; APC mean (min, max): 4.6 (-0.3, 12.1%)). MM at Dx increased across all regions in males (19 to 25%); APC mean (min, max): 4.9 (0.7, 8.7%) and females (15 to 21%); APC mean (min, max): 6.5 (0.2, 10.2%)), with SA having the highest increase in MM burden (22 to 30%; APC mean (min, max): 5.9 (3.3, 20.7%)) among all ethnicities. Crude mortality rates declined in male (124 to 104/100 PY; APC mean (min, max): -3.5 [-1.1, -7.1%]) and female (100 to 81/100 PY; APC mean (min, max): -4.6 [-1.5, -10.6%]), male having significantly higher rate (p<0.05). Correlation of early Dx with death rate reduction was not observed, with 25% regions with >28% early diagnosis but <100/100 PY death rate.

Conclusions: High regional variations in early Dx, MM and death rate were observed across all incident lung cancer population strata, over the analysed time period. While the early Dx and mortality reduction in lung cancer is marginal and heterogeneous across English regions, there is an urgent need to further optimise early Dx and care management pathways in multi-ethnic society with increasing multimorbidity.

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