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Original Research

Factors associated with late HIV diagnosis in North-East Scotland: a six-year retrospective study

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ABSTRACT

Objectives: Late HIV diagnosis is associated with increased morbidity and mortality, increased risk of transmission, impaired response to antiretroviral therapy and increased health care costs. The aim of this study was to determine the factors associated with late HIV diagnosis in Grampian, North-East Scotland.

Study design: A population based retrospective database analysis.

Methods: All newly diagnosed HIV positive individuals in Grampian, North-East Scotland between 2009 and 2014 were included in the study. Participants were classified as having a late diagnosis if the CD4 cell count at presentation was less than 350 cells/mm³. Socio-economic and demographic factors were investigated in relation to outcome (late diagnosis) using Chi-squared and Mann–Whitney tests.

Results: CD4 cell count results were available for 111 (89.5%) of the 124 newly diagnosed individuals during the study period. The prevalence of late diagnosis was 53.2% ($n = 59$). Those infected via heterosexual mode of transmission had a 2.83 times higher odds of late diagnosis (OR 2.83 [95% CI: 1.10–7.32]) than men who have sex with men (MSM) and those with no previous HIV testing had a 5.46 increased odds of late diagnosis (OR 5.46 [95% CI: 1.89–15.81]) compared to those who had previously been tested. Missed opportunities for HIV diagnosis were identified in 16.3% ($n = 15$) of participants.

Conclusion: Heterosexual individuals and those with no previous HIV testing were more likely to be diagnosed late. Targeted initiatives to increase perception of HIV risk and uptake of testing in these risk groups are recommended.

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Introduction

Human immunodeficiency virus (HIV) infection is now a treatable medical condition with the introduction of effective antiretroviral therapy (ART) which has improved clinical outcomes for people living with the infection. Despite this, there continues to be avoidable morbidity and mortality associated with HIV in the UK.¹ Undiagnosed, untreated and advanced infection facilitates onward HIV transmission and impinges upon both individual and wider population health. In 2013, around 107,800 people were estimated to be living with HIV in the UK and it is estimated that about a quarter (24%) of these people are unaware of their infection status.² All persons living with HIV are at some risk of transmitting HIV to others; those who are unaware of their infection are particularly important because they unknowingly could infect others without realizing.²

Late HIV diagnosis has been associated with increased morbidity³ and mortality,⁴ blunted response to ART⁵ and increased health care costs.^{6,7} Late diagnosis has been identified as a major risk factor for early intensive care unit admission in HIV infected patients⁸ and is the largest remediable factor for HIV-associated deaths in the UK.⁴ A national audit of deaths amongst HIV positive adults determined that 24% of deaths were directly attributable to late diagnosis of HIV.⁴ The UK Collaborative HIV Cohort (UK CHIC) study found that commencing ART at a CD4 cell count of less than 350 cells/mm³ resulted in up to 15 years loss of life.⁹ Health care costs in the year preceding diagnosis have been found to be 200% higher for those who present late.⁶ Furthermore, knowledge of HIV status has been linked to a reduction in risk-taking behaviour and thus it has been suggested that the HIV/AIDS epidemic could be reduced substantially by increasing the number of HIV positive individuals who are aware of their status.¹⁰

Current literature shows that many 'late presenters' were seen in the recent past by health care professionals but failed to be diagnosed¹¹ and a national audit conducted in 2010 by the British HIV Association identified that a quarter of patients had a missed opportunity for diagnosis.¹²

In 2014 UNAIDS established a new global 90-90-90 treatment target for HIV; by 2020, 90% of all people living with HIV will know their HIV status, 90% of all people with diagnosed HIV infection will receive sustained ART and 90% of all people receiving ART will be suppressed.¹³ Given recent reports that suggest that around a quarter of people living with HIV in the UK are currently unaware of their infection status,² it is clear that late diagnosis of HIV is an important health care issue requiring address in order to meet the 90-90-90 target and improve health outcomes for people living with HIV.

Whilst several studies have been conducted worldwide to investigate late or missed diagnosis of HIV, limited studies have been conducted within the UK. An observational study of 1536 newly diagnosed HIV patients in Brighton found that older adults, aged 50 years or older, were more likely to present late and had a higher mortality. The authors additionally identified African origin and being a male heterosexual as factors associated with late presentation.¹⁴ Within North-East Scotland only one relevant study has been published to date.¹⁵

However, this study focused primarily on missed HIV diagnoses and compared the diagnostic pathways of two earlier cohorts of patients; 1995–2000 and 2004–2009.

A recent search of PubMed did not reveal any study in the North-East of Scotland that explored factors associated with late HIV diagnosis. Thus, this study aims to examine the factors associated with late diagnosis of HIV in Grampian with the aim to provide research evidence and basis for the development of targeted interventions and educational programmes for earlier diagnosis of HIV in North-East Scotland.

Methods

Study design and setting

The study was a population based retrospective database analysis. It involved the analysis of routinely collected HIV surveillance data from the Health Protection Scotland (HPS) HIV database and the review of case notes of all newly diagnosed HIV patients' during the study period.

The HPS HIV database was set up in the early 1980s to collate data on all newly diagnosed HIV antibody positive individuals and AIDS cases to monitor trends in diagnosed HIV infection and AIDS cases among the Scottish population and to provide timely and useful information for the targeting of health promotion, the evaluation of preventive measures, and the planning of medical and social services for those affected by HIV. Information on newly diagnosed HIV/AIDS infection come from reporting of all newly diagnosed HIV infections by virology laboratories in Scotland and AIDS diagnoses by clinicians. In addition, the General Register Office for Scotland (GROS) reports all deaths that record AIDS or HIV among the causes of death to HPS. Records of HIV diagnosis, AIDS and death, which are regarded as relating to the same individual, are merged to create one record in the database.¹⁶

Setting

The setting of the study was Grampian, North-East Scotland. In 2015, the population of Grampian was estimated to be 587,820. Around 10% of the workforce is employed directly by the oil and gas industry. The oil and gas workforce is very mobile with frequent contacts and activities in countries where the prevalence of HIV is high. In addition, Aberdeen has two prestigious universities that offer postgraduate degree programmes in oil and gas engineering and law that are popular among students from countries where the prevalence of HIV is high.¹⁷

HIV care within the National Health Service (NHS) Grampian Health Board is shared between the Genitourinary Medicine (GUM) and Infectious Diseases (ID) departments; inpatient care is provided in Aberdeen Royal Infirmary's regional ID unit and outpatient care is delivered by both GUM and ID.

Definitions

The primary outcome of interest was late HIV diagnosis which, is defined by The European Late Presenter

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