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Recent Increase in HIV cases in Oman

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The advent of antiretroviral therapy (ART) has transformed the human immunodeficiency (HIV) infection prognosis from a life-threatening disease to a manageable chronic condition with a near-normal life expectancy.¹ Besides, people living with HIV/AIDS (PLWHA) on regular ART with a suppressed HIV viral load (VL) do not infect their sexual partners.² Despite these remarkable developments in treatment and prevention, HIV/AIDS remains a major global public health threat. The most recent Joint United Nations Programme on HIV and AIDS (UNAIDS) global AIDS report shows that there were 38.4 million PLWHA in 2021; 1.5 million became newly infected, far short of the 2025 target of 370,000 new infections.³ Furthermore, 650,000 AIDS-related deaths occurred in 2021, more than 2 folds of 2025 target of 250,000 deaths.³

Of concern, the 2022 UNAIDS report warned that the global HIV/AIDS response was in danger. In Asia and the Pacific region, new HIV infections increased in 2021 where they had been decreasing over the last decade. In addition, the Eastern Europe and Central Asia, the Middle East and North Africa (MENA) and Latin America have all seen surges in annual HIV infections over the past 10 years.³ Indeed, the new HIV infections in the MENA region have increased by 33% over the last 10 years. Of note, country-level data was only available for 11 out of 21 countries in the MENA region; the annual new HIV cases, in the period from 2011 to 2021, had increased in Algeria (167%), Yemen (77%), Lebanon (41%), Qatar (40%), Oman (35%) and

31 Bahrain (8%). In contrast, the annual new HIV infections, over the same period, had decreased
32 in Djibouti (-63%), Morocco (-48%), Libya (-21%), Sudan (-2%) and Tunisia (-1%).⁴

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34 Oman is situated in the Arabian Peninsula, with a total population of 4,931,506; 2,064,778
35 (41.9%) are non-Omanis.⁵ The first case of HIV/AIDS in Oman was diagnosed in 1984, and the
36 National AIDS Programme (NAP) was formed in 1987. Currently 14 public treatment centres
37 offer free HIV care, including antiretroviral therapy (ART) and testing for HIV genotyping, HIV
38 VL, and CD4 count. The country adopted treatment for all, irrespective of CD4 cell count, in
39 December 2015.⁶

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41 A total of 3580 Omani citizens were diagnosed with HIV from 1984 to 2021, of whom 1996
42 (56%) were alive as of 31 December 2021.⁷ Figure 1 shows the HIV cases among Omani
43 nationals from 2010 to 2021, stratified by year of diagnosis and sex. Males accounted for 62%
44 (88/143) and 84% (169/202) of HIV cases among Omani citizens in 2010 and 2021, respectively;
45 however, the proportions of males among all HIV cases in the country, including the non-
46 Omanis, were 57% (154/272) and 67% (221/335) in 2010 and 2021, respectively. In addition, the
47 distribution of age at diagnosis has changed over time; the percentage of those aged 25-34 years
48 rose from 31 % (44/143) in 2010 to 46% (92/202) in 2021, while the proportion of persons aged
49 35-44 years decreased from 26% (37/143) to 19% (39/202) in the same periods; however, the
50 percentage of those aged ≥ 45 years had remained the same, at 18% (Figure 1). Sexual
51 transmission has been the main driver of the epidemic; the proportions of new infections
52 attributed to sexual contact accounted for 94% (134/143) of infections in 2010, compared to 97%
53 (195/202) in 2021. The CD4 count at diagnosis is often used as marker of late HIV diagnosis.
54 For Omani PLWHA diagnosed between 2010-2021, about two-thirds (69.9%) had a baseline
55 CD4 count of < 350 cells/mm³ and 41.3% had a baseline CD4 count of < 200 cells/mm³. Out of
56 PLWHA who were alive as of 31 December 2021 (n=1996), 81% were on ART; the proportion
57 of patients with viral suppression (HIV VL < 1000 copies/ml) out of those on ART was 90%
58 (1457/1617).⁷

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60 The recent increase in the new diagnoses in Oman may be explained, in part, by an increase in
61 HIV testing rather than an increase in the HIV incidence as suggested by the persisting high

62 levels of late HIV diagnosis. However, the rise in new cases in persons aged 25-34 years might
63 suggest high risk-taking behaviour in this cohort.⁸ Indeed, the UNAIDS 2021 report shows that
64 the overall HIV incidence (0.07 per 1000 population) and prevalence (0.2 per 1000 population)
65 in Oman were stable in 2010-2021.³ Future epidemiological and behavioural studies to determine
66 the precise dynamic of HIV incidence, and the key populations in Oman are warranted.

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68 The association between late HIV diagnosis and increased morbidity and mortality is well
69 established. Late HIV diagnosis is associated with a ten-fold increased risk of death within 12
70 months of diagnosis.⁹ Late-stage HIV diagnosis also increases the risk of onward transmission
71 and the cost of treatment and care.^{10, 11} The high proportion of late HIV diagnosis in Oman could
72 be due to several reasons. A primary factor is the high level of HIV-related stigma and
73 discrimination that prevent access to HIV testing services.^{12, 13} In addition, HIV prevention
74 services targeting key populations and their partners are very limited. Furthermore, social
75 disapproval of and punitive laws against high-risk behaviours such as sex work, injecting drug
76 use and homosexuality.¹³ To reduce the rates of late HIV diagnosis in Oman, the NAP has
77 recently published an HIV manual for primary health care (PHC) intending to increase the HIV
78 testing levels in PHC.¹⁴ Evidence shows that primary and secondary care providers frequently
79 miss opportunities for earlier HIV diagnosis, through a combination of lack of awareness of
80 clinical syndromes, identifying possible risk factors and a general reluctance to discuss HIV
81 testing.¹⁵

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83 In September 2022, the World Health Organization (WHO) certified that Oman had eliminated
84 mother-to-child transmission of HIV and syphilis, becoming the first country in the WHO
85 Eastern Mediterranean Region and only the sixteenth country in the world to achieve this.^{16, 17}
86 This accomplishment is a testimony of Oman's potential to end the AIDS epidemic by 2030
87 realising the goal of the Global Health Sector Strategies on HIV, viral hepatitis and sexually
88 transmitted infections (GHSS) for the period 2022-2030.¹⁸ To achieve this ambitious goal, the
89 NAP in Oman must focus on two key GHSS targets, the reduction of the percentage of people
90 starting ART with a CD4 count of < 200 cells/mm³ to <10% and the use of combination HIV
91 prevention by 95% of people at risk of HIV by 2025.

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93 The rates of ART coverage and viral suppression in Oman are encouragingly high^{19, 20}, with a
94 consequent decline in the community HIV viral load; however, this has not resulted in reducing
95 the HIV incidence in the country due to the high levels of late-stage HIV diagnosis. High
96 proportions of PLWHA in Oman were diagnosed several years after acquiring the HIV infection
97 and would have infected many people prior to their HIV diagnosis and initiation of ART. To
98 reduce the rate of late HIV diagnosis and maximize the public health benefit of treatment as
99 prevention, it is paramount to expand the HIV testing services in the country through
100 decentralized and differentiated HIV testing services, with timely linkage to treatment and care.
101 Different HIV testing approaches, including clinical settings, community-based approaches or
102 self-testing might be used depending on epidemic dynamics and population needs; persons who
103 are at risk of HIV but who test HIV negative should also be linked to HIV prevention services.
104 While increasing the rates of HIV testing will, paradoxically, identify more cases in the short
105 term, the long term results will be improved morbidity and mortality in PLWHA and a decline in
106 onward transmission in the community.

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108 Establishing combination HIV prevention, including male and female condoms, treatment as
109 prevention, pre-exposure prophylaxis, post-exposure prophylaxis and harm reduction services for
110 persons who inject drugs, is challenging; only 8% of people at risk of HIV in the world used
111 combination HIV prevention in 2020. The lack of data about the size of and HIV prevalence
112 among people at risk of HIV and the cultural context in Oman are compounding factors.
113 However, maintaining the status quo is not an option; establishing HIV prevention services that
114 respect Oman's religion, culture and traditions is warranted. To raise awareness of HIV among
115 the general population, culturally-sensitive information about HIV prevention, diagnosis and
116 prevention can be disseminated through mass media, including social platforms. In addition,
117 outreach awareness campaigns in colleges, universities and workplaces can target young people,
118 including those aged 25-34 years. These initiatives can be led by a national committee, with
119 members from all relevant stakeholders, including PLWHA, people at risk of HIV, community
120 and faith leaders, civil society organisations, the ministry of health, the ministry of education and
121 law-enforcing agencies.

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123 To conclude, the annual new HIV cases in Oman have exceeded 140 in the last four years.
124 However, despite this recent increase in HIV cases, the HIV epidemic in the Sultanate has
125 remained a low-prevalence one over the past decade. Sexual transmission has been the main
126 driver of the epidemic in the country, with males and those aged 25-34 years disproportionately
127 affected. Future epidemiological studies to determine the characteristics of people at risk for HIV
128 in Oman and inform targeted interventions are warranted.

129

130 **Authors' Contribution**

131 AE and SA contributed to the idea conceptualization. SS, MA and AE contributed to data
132 curation and formal analysis. AE contributed to writing (original draft) the manuscript. SS, ZA,
133 MA, RL, BA and SA contributed to writing (review and editing) the manuscript. All authors
134 approved the final version of the manuscript.

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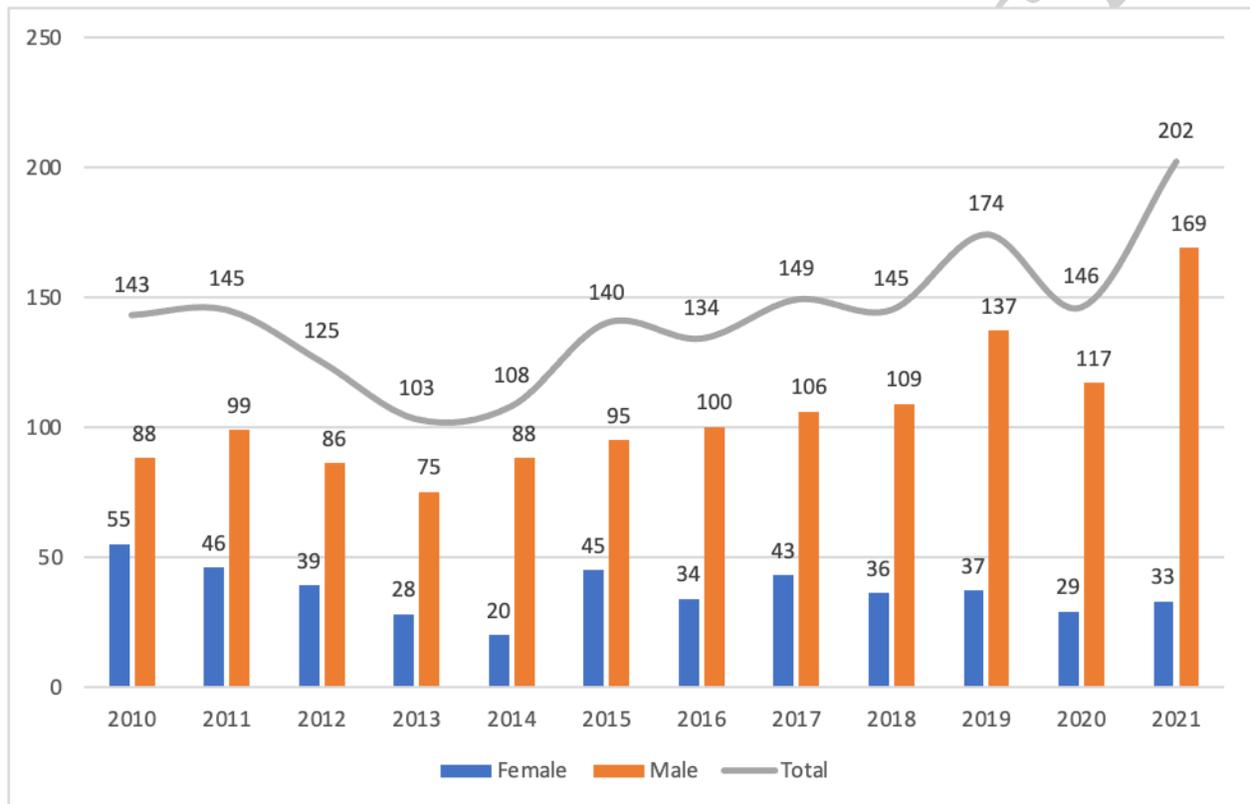
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194 **Figure 1:** New HIV cases among Omani Nationals stratified by Sex, 2010-2021