



HIV INFECTION IN BESUT, TERENGGANU: EPIDEMIOLOGIC TRANSITION, MORTALITY AND ASSOCIATED RISK FACTORS: A 17-YEAR REVIEW (2005-2022)

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INTRODUCTION

- Approximately 35 million people worldwide are infected with human immunodeficiency virus (HIV) in 2020 and it appears that the disease is identified as an important cause of death in the world (1).
- In Malaysia, the country's epidemic was mostly pushed by people who injected drugs (PWID) at an early stage, but this sample shifted towards increasing sexual transmission (2). HIV if left untreated would lead to high case fatality rate.
- This study aimed to determine the epidemiologic transition of HIV transmission; case fatality rate and determinants for HIV mortality in Besut district, Terengganu.

Table 1: Factors associated with HIV mortality in Besut by simple and multiple logistic regression (N=692)

Characteristics	Crude OR (95% CI) ^a	p-value ^a	Adj. OR (95% CI) ^b	p-value ^b
Age	0.99 (0.98,1.01)	0.829	-	-
Gender				
Female	1	1	1	1
Male	0.66 (0.41, 1.07)	0.091	1.62 (0.92, 2.85)	0.093
Marital status				
Married	1	1	1	1
Single	0.74 (0.46, 1.19)	0.229	1.49 (0.87, 2.55)	0.145
Divorced	1.16 (0.56, 2.39)	0.676	1.32 (0.61, 2.85)	0.474
Education level				
Tertiary	1	1	1	1
Primary	0.35 (0.14, 0.91)	0.359	0.37 (0.11, 1.22)	0.104
Secondary	1.47 (0.59, 3.61)	0.399	1.27 (0.41, 3.91)	0.667
Occupation				
Professional	1	1	1	1
Unemployed	1.94 (0.73, 5.16)	0.181	-	-
Non-professional	0.86 (0.23, 3.14)	0.828	-	-
Student	1.85 (0.45, 7.52)	0.386	-	-
Prison inmate	1.32 (0.42, 4.12)	0.626	-	-
Transmission mode				
IVDU	1	1	1	1
Heterosexual	3.53 (2.41, 5.17)	<0.001	3.62 (2.32, 5.65)	<0.001*
Homosexual	2.01 (0.89, 4.53)	0.093	1.17 (0.43, 3.16)	0.756
Bisexual	0.00 (0.00, 0.00)	0.999	0.00 (0.00, 0.00)	0.999
Vertical	8.70 (2.37, 31.93)	0.001	8.55 (2.04, 35.78)	0.003*
Tuberculosis co-infection				
No	1	1	1	1
Yes	3.29 (1.85, 5.84)	<0.001	3.30 (1.75, 6.19)	<0.001*
Hepatitis B/C co-infection				
No	1	1	1	1
Yes	1.48 (0.26, 8.12)	0.651	-	-

*p-value < 0.05, ^aSimple logistic regression, ^bMultiple logistic regression. Forward LR method applied.

No multicollinearity and no interaction found. Hosmer Lemeshow test, p-value= 0.119. Classification table 91.0% correctly classified. Area under Receiver Operating Characteristics (ROC) curve was 93.7%.

METHODOLOGY

- Study design:** Cross-sectional based on retrospective record review.
- Study samples and setting:** HIV cases in Besut district, Terengganu state of Malaysia.
- Inclusion criteria:** patients who actively underwent HIV clinic follow-up at any of the eight health clinics in Besut, Terengganu or HIV patients who were admitted to Hospital Besut, Terengganu.
- Sample size calculation:** 658 samples using two-proportion formula; P0=0.35 (3), P1=0.25, $\alpha=0.05$, power=80%.
- Sampling method:** Simple random sampling.
- Data collection and research tool:** From National AIDS Registry year 2005-2022 and transferred into patient proforma.
- Independent variables:** sociodemographic and clinical characteristics
- Dependent variable:** HIV mortality status.
- Statistical analysis:** Descriptive statistics, simple and multiple logistic regression analysis were used for data analysis.

RESULTS

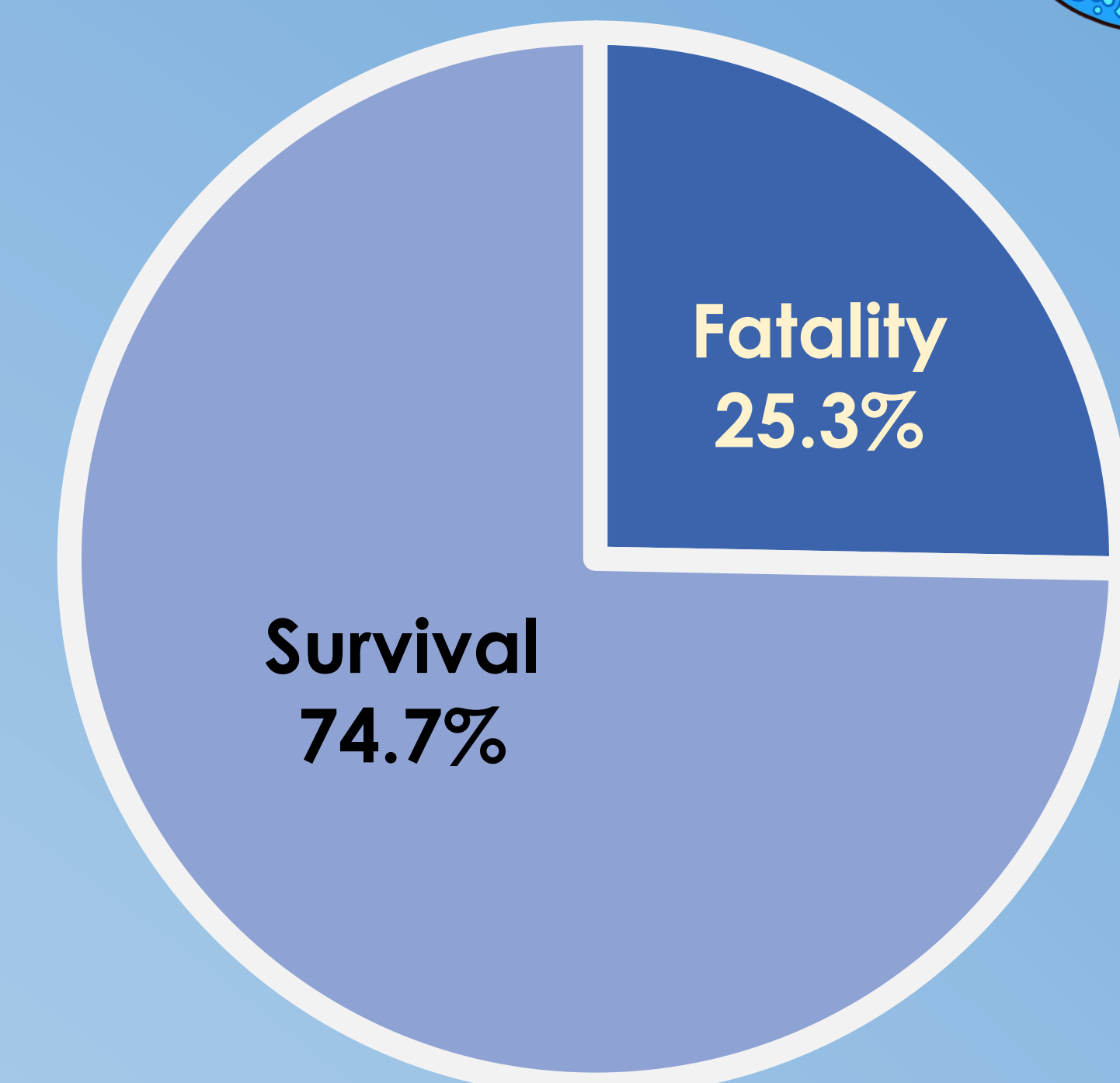


Figure 1: Case fatality rate of HIV cases in Besut, Terengganu from 2005-2022 (N=692)

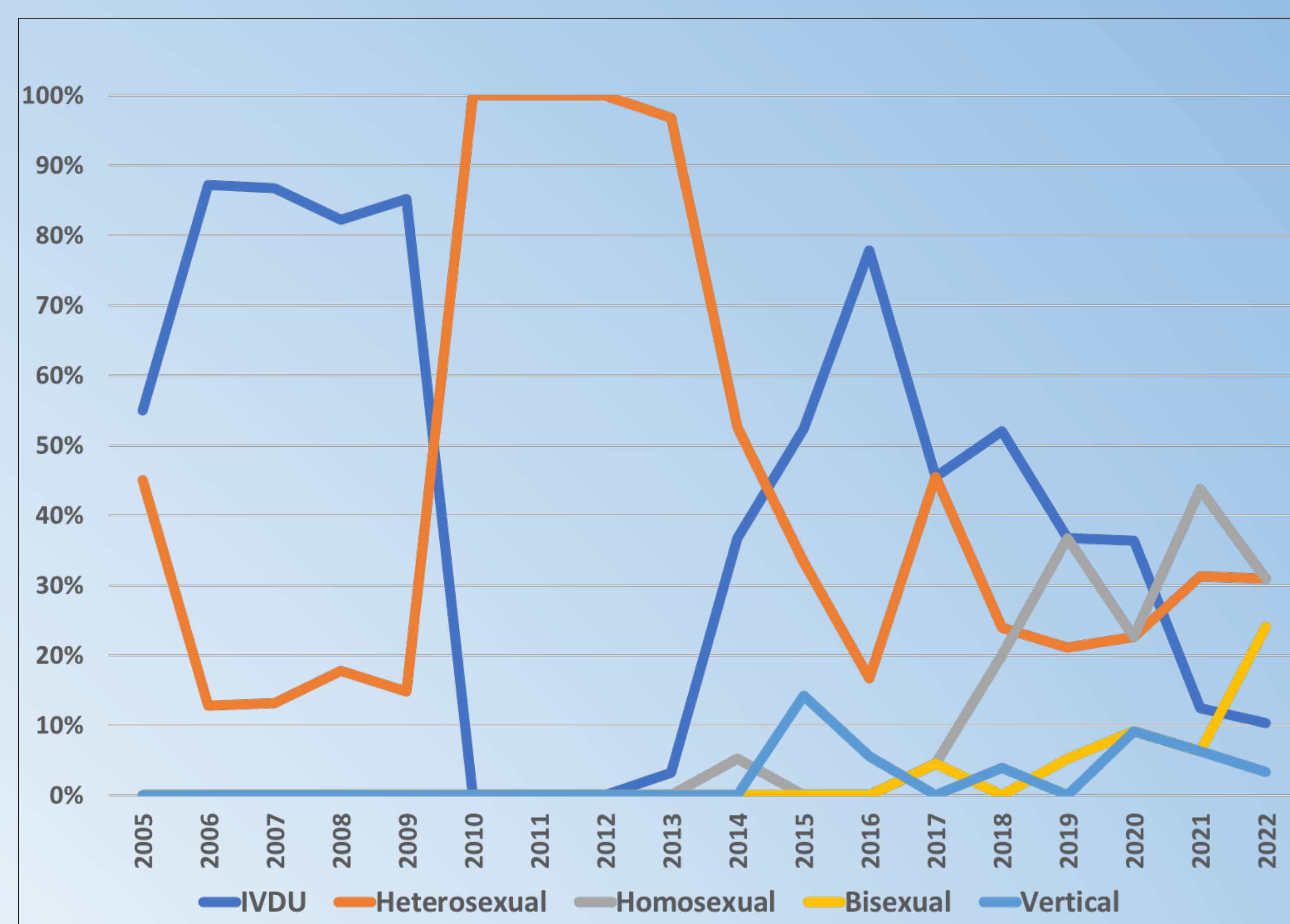


Figure 2: Epidemiologic transition of HIV transmission mode in Besut, Terengganu from 2005 until 2022 (N=692)

DISCUSSION

- From year 2005 until 2022, there were 692 HIV patients diagnosed in Besut and the case fatality rate for HIV is 25.3% (Figure 1).
- Figure 2 showed the epidemiologic transition of HIV transmission mode throughout 17 years from 2005 until 2022. The transmission mode has changed from IVDU into sexual transmission. Many people who inject drugs (PWID) are sexually active, so it is possible that high-seroprevalence HIV epidemics among PWID may initiate self-sustaining heterosexual transmission epidemics (4).
- Men who have sex with men (MSM) either homosexual or bisexual cases show rising trend due to behavioural (role reversal, unprotected casual partnership, barebacking) and biological factors (gut tropism of HIV-1 if practicing anal barebacking) (5).
- Multiple logistic regression revealed heterosexual relationship, vertical transmission and having tuberculosis (TB) co-infection as the significant determinants for HIV mortality as shown in Table 1.
- Worse survival in heterosexuals than in men having sex with men (MSM) had been reported (6), as heterosexuals are more likely to be diagnosed at a later stage with late HAART initiation (7), which contributed to low survival (6).
- In vertically transmitted HIV infection, those dying earlier during infancy are more likely due to infectious pulmonary disease, and those dying later are more likely to have cardiac disease and wasting syndrome (8).
- Meta-analysis of cohort studies reported TB contributed significantly to mortality among people living with HIV (9). TB may act as cofactor in the progression of HIV infection by increasing the HIV viral load through inducing a faster HIV replication (10). Tuberculosis also reduces CD4 lymphocytes counts due to sequestration of CD4 cells in site of active TB cases which subsequently increases mortality risk (10).

CONCLUSION & RECOMMENDATIONS

- Around one-fourth of HIV patients in Besut succumbed to death.
- Besut's HIV epidemic was caused by intravenous drug users at an early stage, but gradually shifted towards sexual transmission.
- MSM either homosexual or bisexual relationship currently show rising trend as the mode of HIV transmission in Besut.
- Heterosexual relationship, vertical transmission and having tuberculosis co-infection were the significant determinants for HIV mortality in Besut.
- Improved treatment is especially necessary in pinpointed risky group of population.
- Public health strategies should no longer focus on harm reduction program for IVDU such as needle and syringes program, but need to be re-orientated to destigmatizing key population of HIV clients (MSM) in order to increase uptake of HIV screening and treatment in healthcare facilities.
- Vertical transmission was a significant factors for HIV mortality and would no longer be a major issue in Malaysia as Malaysia has been certified by WHO as having eliminated mother-to-child transmission (MTCT) of HIV in 2018.
- Prophylaxis and timely treatment for tuberculosis among HIV clients need to be strengthened to avert HIV mortality in cases with TB co-infection.

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