Determinants of late presentation to HIV/AIDS care in Southern Tigray Zone, Northern Ethiopia: an institution based case–control study

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Abstract
Background: Late diagnosis and presentation to human immune deficiency virus (HIV)/acquired immune deficiency syndrome care reduce the benefits of antiretroviral therapy and increase the risk of HIV transmission.

Objectives: This study was conducted to identify determinants of late presentation to HIV care among people living with HIV in Southern Tigray, Northern Ethiopia.

Methods: An institution based un-matched case–control (1:2 ratios) supported with qualitative data was conducted in Southern Tigray Zone from March 1 to April 30, 2014. Individuals with HIV enrolled from six randomly selected health facilities were included in the study. Cases were people living with HIV who had cluster of differentiation four count <350 cells/μl or World Health Organization stages 3 or 4. A total of 442 study participants were included by systematic sampling techniques. Bivariable and multivariable binary logistic regression model was used to identify associated factors. Odds ratio with 95% CI was computed to assess the strength of the associations.

Result: Age categories, 25–29 years [AOR 3, 95% CI (1.2–8.1)] and 35–39 years [AOR 4.1, 95% CI (1.4–12.5)], having two [AOR 6, 95% CI (1.3–28)] and more [AOR 5.2, 95% CI (1.1–24.8)] lifetime sexual partners, poor social support [AOR 2.3, 95% CI (1.26–4.30)], second (next to lowest) wealth quintile [AOR 3.3, 95% CI 91.3–8.5], fear of stigma [AOR 4.4, 95% CI (2.2–8.3)], fear of losing job [AOR 6.8, 95% CI (1.8–24.5)], and reported severe illness [AOR 4.3, 95% CI (2.26–8)] were identified to be the risk factors for late presentation.

Conclusion: Low socio-economic status and social support, fear of stigma were potential risk factors for late presentation. Efforts towards promoting early care seeking should target on these factors in the study area and other similar settings.

Keywords: Late presentation, HIV/AIDS, Determinants, Case–control, Ethiopia

Background
An estimated of more than 35.3 million adults were living with human immune deficiency virus (HIV) worldwide; and nearly two-third (69%) of this were found in Sub-Saharan Africa [1]. The European Late Presenter Consensus Working Group (ELPCWG), defines “late presentation” as initial presentation to HIV care with a CD4 cell count of <350 cells/μl, and defines “presentation with advanced HIV disease” as presentation for care with a CD4 count below 200 cells/μl or any acquired immune deficiency syndrome (AIDS)-defining illness or event [2]. Clinically, late presentation limits opportunities to reduce further transmission [1, 2].

Introduction of antiretroviral therapy (ART) has substantially reduced the burden of HIV by decreasing the risk of death and improving treatment response. Late presentation for HIV care is associated with high risk

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of death, acquiring opportunistic infection and poor response to treatment [3–5]. Although people on ART have increased risk for non–AIDS illness, early initiations of ART is the option in developing countries including Ethiopia for people with HIV [6].

Previous studies and reports in Sub-Saharan Africa showed that 35–65 % of HIV patients initially present with a CD4 cell counts less than 200 cells/μl or with an AIDS-defining illness [6–9] and 20–40 % start ART with a CD4 counts <100 cells/μl. Such late presentation is associated with lower survival, early mortality and invasive bacterial and fungal infections [4]. It is also a major reason for the decreasing of retention rates in the course of ART [3, 5, 6, 10, 11]. In addition to it, late presentation also poses a higher cumulative risk of HIV transmission to others [6, 12, 13] as well as an economic burden to individuals particularly in the first few months of presentation [12].

Although findings on late presentation are limited, the problem of late ART initiation and its poor outcomes has been reported by some researches in Ethiopia [14–16].

Different scholars from developed [5, 6, 12] and developing countries [3, 5, 6] state various definitions, reasons and determinants of late presentation to HIV care. Studies from Ethiopia are scarce at diversified contextual/structural, clinical and individual level factors. Identifying the factors associated with late presentation for HIV care seeking is important for the improvement of HIV/AIDS prevention and control programs. It also helps to early undertakes for decisions makers and program managers on the upcoming revision of country wide HIV testing and care strategies. Therefore, it is important to identify the determinants of late presentation to HIV care.

Methods

Study design and study population

Un-matched case control study design supported with qualitative data was conducted from March 1 to April 20, 2014 (data collection period) in Southern Tigray Zone. The zone is located in the northern part of Ethiopia 645 km away from Addis Ababa, the capital city of Ethiopia. During the study period a total of 20 health facilities (3 general hospitals and 17 health centers) were providing voluntary counseling and testing, prevention of mother to child transmission, ART and treatment of opportunistic infection services.

The study population consisted of people over 18 years of age with HIV who were enrolled in HIV chronic care clinics and had visited the health facilities during the data collection period. Cases were people living with HIV/AIDS who had CD4 count less than 350 cell/mm³ or World Health Organization (WHO) clinical stage III or IV during their first clinical visit for HIV care. Controls were PLWHA whose CD4 count was ≥350 cell/μl and WHO clinical stage I or II. Focus group discussions (FGD) were conducted with PLWHA who were a member of mother’s supporting group.

Sampling techniques and sample size determination

The sample size was calculated using Epi Info version 7.0 by considering the following assumptions: the proportion of HIV status non-disclosure to partners among the cases was 46.2 and 29.4 % among the controls [17], using 95 % CI, 90 % power and case to control ratio of 1 to 2 to detect an odds ratio of 2. Then by adding 10 % non-response rate, the final sample size was 442 (147 cases and 295 controls). Previous studies have indicated that non disclosure of HIV status to partners, alcohol use and perception of stigma increase for late presentation. Non disclosure of HIV status to partner was selected to maximize sample size.

Simple random sampling techniques were applied to select respondents. Two district hospitals and four health centers were selected randomly.

After collecting baseline CD4 count and/or WHO staging using chart reviews, people living with HIV/AIDS were classified in two groups before data collection began. Cases and controls were then selected using systematic random sampling techniques based on visits that occurred during the data collection period. We divided the sample among the six participating health institutions with a ratio of five cases to two controls. HIV-positive individual’s under 18 years of age, those with neither CD4 count data nor WHO HIV/AIDS stage recorded at first visit, and those who were overtly cognitively impaired were excluded from the study.

Data collection and analysis

The data were collected using an interviewer administered technique by 11 trained clinical nurses working in ART clinics and supervised by two health officers. Pre-coded and structured questionnaires consisted of sociodemographic, socioeconomic, behavioral, psychosocial and social environments were used. Data collectors and supervisors were trained with respect to the objectives of the study; confidentiality of information, respondent’s rights, and interviewing technique prior to the actual data collection.

Wealth quintile information was by asking about the presence or absence of durable assets and services at the house hold level. Different indicators were used for urban and rural areas to measure wealth quintiles. The index was constructed for each household via principal components analysis. Indicators having ≥50 % rescaled communalities were used to construct wealth index and further
Data were entered to Epi Info version 7 and transferred to SPSS 20 for further statistical analysis. Descriptive and summary statistics were computed. Both bivariable and multivariable logistic regression models were used to identify associated factors. Variables having p value less than 0.2 in the bivariable analysis were remained in the multivariable model to control the effect of confounders. The Hosmer–Lemeshow goodness-of-fit statistic was used to assess the fitness of the model. Odds ratios (OR) with their 95% confidence intervals (95% CI) were calculated to measure the strength of association. P value less than 0.05 were considered to be significant determinants for cases and controls.

Qualitative data were collected by the principal investigator through FGD parallel to quantitative data collection. The recorded data were transcribed, translated and analyzed using thematic analysis under the sub headings of the quantitative findings and new themes for new findings.

Ethical consideration
This study was carried out after receiving ethical approval from the Institutional Review Committee of University of Gondar. Prior to approval, the proposal was provided to reviewers to assure the ethical issues. Permission letter was also obtained from the respective health institutions (medical director or persons in charge of institutions) to identify cases and controls through chart review by authorized ART case managers or ART nurses. Before interviewing or recording, the data collector fully explained the purpose of the study to each participant and obtained written informed consent from each participant. To ensure confidentiality, names were not mentioned in the questionnaire and result report. In addition, the collected data were locked.

Result
A total of 413 HIV positive individuals (147 cases and 266 controls) participated in this study. The median age (IQR) at time of presentation was 30 (±13) years. The median age (IQR) at time of presentation for cases and controls were 30 (±11) and 30 (±13), respectively (Table 1).

Determinants of late presentation
Age group, having had multiple sexual partners, poor socioeconomic status, non-disclosure status to partner, presentation before 2011, low household social support, desire to protect family, severity of illness, fear of stigma and fear of losing job were all found to be independent risk factors for late presentation to HIV/AIDS care (Table 2). Participants in the age group of 25–29 years [AOR 3, 95% CI (1.15–8.12)] and those 35–39 years [AOR 4.1, 95% CI (0.35–12.46)] were 3 and 4.1 times more likely to present late, respectively, as compared to those 18–24 years of age.

Year of presentation was associated with likelihood of late presentation. Those study participants who were visiting the HIV care before 2008 were presenting lately. The risk of late presentation to HIV care among PLWHA who presented in the years 2011–2012 [AOR 0.31, 95% CI (0.12–0.77)] and 2013–2014 [AOR 0.14, 95% CI (0.05–0.37)] was decreased by 69 and 86%, respectively, as compared to those presenting before the year 2008.

Presence of more than one lifetime sexual partner was also associated with late presentation to HIV care. HIV-positive individuals with two lifetime sexual partners were six times [AOR 6, 95% CI (1.28–28.02)] more likely to present late as compared with participants with none. Those with more than two life time sexual partners were also 5.2 times [AOR 5.2, 95% CI (1.08–24.76)] more likely to present late compared to those with none.

The second (next to lowest) wealth quintile of HIV-positive individuals was 3.3 times [AOR 3.3, 95% CI (1.31–8.46)] more likely to present late as compared to the highest wealth quintile group.

Partner or spousal HIV status disclosure was found to deter presentation. Married participants who did not disclose their HIV status to their partner were two times more likely to present late [AOR 2, 95% CI (1.05–4.14)] compared to those who did.

HIV positive individuals who had poor house hold social support were 2.3 times more likely to present late as compared to those who had good social support at home [AOR 2.3, 95% CI (1.26–4.30)].

Barriers perceived by PLWHA were also associated with late presentation. Participants who reported fear of stigma were 4.4 times more likely to present late as compared to those who did not [AOR 4.4, 95% CI (2.23–8.27)]. Participants who reported fear of losing their source of income were 6.8 more likely to present late as compared to those who did not [AOR 6.8, 95% CI (1.8–24.54)].

The way participants perceived the benefits of HIV care also contributed to discrepancy in stage at presentation. Participants who responded that “protecting family” was their reason for initiating care were 81% less likely to present late, as compared to those who did not [AOR 0.19, 95% CI (0.09–0.37)]. By contrast, participants who responded that “severe illness” was a reason for initiating care were 4.3 times more likely to present late as compared to those who did not [AOR 4.3, 95% CI (2.26–8.0)].

The qualitative results revealed that fear of stigma, fear of losing income source/former job, use of alternative...
therapies, lack of familial pressure to initiate care, inadequacy of social support (spouse, friends and religious leaders) and inadequate knowledge about delay to care were the barriers reported by people living with HIV/AIDS in the study area (Table 3).

Discussion
This study identified determinants of late presentation to HIV/AIDS care in ART services are accessible at primary health care units. Although different studies reported various risk factors for late presentation, the present study assessed people’s perceived need for care, perceived barriers to HIV care, socioeconomic status, and the role of social support.

Consistent with previous studies in Europe and Africa [11, 19–22, 29] HIV-positive participants were present late for care when their age gets old. It has been posited that when age increase adults are more likely to have a moral or ethical reason for presenting earlier to care. However, a study in India reported young adults present late [23]. This could be explained by differences in method and project design, as well as varying social and cultural issues. In countries like Ethiopia, old peoples considered as immaculate. In the context of the study setting elder individuals are a pronounced in the milieu.

Participants with a history of multiple sexual partners were more likely to present late to care. This was also reported in previous study in Ethiopia [17]. However, in Uganda [11] and Venezuela [24] HIV-positive individuals with more than one sexual partner presented early. One factor for this different finding might be the emphasis of taboo on sexually active behaviors in Ethiopian society, and an increased propensity to feel embarrassment regarding this behavior [25]. Although having legal multiple sexual partners are practiced in Islamic religions of

| Variables                        | Cases, N (%) | Controls, N (%) |
|----------------------------------|--------------|-----------------|
| Sex                              | Male 55 (37.4) 86 (32.3) | Female 92 (62.6) 180 (67.7) |
| Marital status at first presentation | Married 73 (49.7) 122 (45.9) | Widowed 22 (14.9) 37 (13.9) |
|                                  | Divorced 34 (23.1) 67 (25.2) | Never married 18 (12.2) 40 (15) |
| Pregnancy (18–49)                | Yes 11 (12.4) 29 (17) | No 78 (87.6) 141 (82.9) |
| Education at first presentation   | Can’t read and write 87 (59.2) 167 (62.8) | Primary (1–8) 40 (27.2) 74 (27.8) |
|                                  | Secondary and above 20 (13.6) 25 (9.4) |
| Residence                        | Urban 93 (63.3) 154 (57.9) | Rural 54 (36.7) 112 (42.1) |
| Occupation                       | Farmer 34 (23) 79 (29.7) | Professional/business occ. 37 (25) 49 (18.4) |
|                                  | Unemployed 25 (17) 45 (16.9) | House wife 27 (18.4) 53 (19.9) |
|                                  | Daily laborer 24 (16.3) 40 (15) |
| Age category                     | 18–24 19 (12.9) 63 (23.7) | 25–29 35 (23.8) 48 (18) |
|                                  | 30–34 36 (24.5) 58 (21.8) | 35–39 28 (19) 32 (12) |
|                                  | 40–44 16 (10.88) 32 (12) | 45+ 13 (8.8) 33 (12.4) |
| Wealth quintiles (SES)           | Lowest 40 (27.2) 42 (15.8) | Second 39 (20.4) 47 (17.7) |
|                                  | Third 24 (16.3) 57 (21.4) | Fourth 26 (17.7) 59 (22.2) |
|                                  | Highest 18 (12.2) 61 (22.9) |
Table 2 Binary and multiple logistic regressions showing determinants of late presentation to HIV/AIDS care, among PLWHA receiving HIV care, Southern Tigray zone, Northern Ethiopia, 2014

| Determinants/factors | Presentation to HIV care | COR (95% CI) | AOR (95% CI) |
|----------------------|--------------------------|--------------|--------------|
|                      | Cases (%) | Control (%) |               |               |
| Year of presentation |           |             |               |               |
| Before 2008          | 37 (25.2) | 46 (17.3)   | 1             | 1             |
| 2009–2010            | 62 (42.2) | 65 (24.4)   | 1.2 (0.681–2.06) | 0.76 (0.33–1.73) |
| 2011–2012            | 27 (18.4) | 65 (24.4)   | 0.51 (0.277–0.963) | 0.31 (0.12–0.77)** |
| 2013–2014            | 21 (14.3) | 90 (33.3)   | 0.29 (0.153–0.552) | 0.14 (0.05–0.37)** |
| Age category         |           |             |               |               |
| 18–24                | 19 (12.9) | 63 (23.7)   | 1             | 1             |
| 25–29                | 35 (23.8) | 48 (18)     | 2.4 (1.23–4.73) | 3.0 (1.15–8.12)** |
| 30–34                | 36 (24.5) | 58 (21.8)   | 2.0 (1.06–3.98) | 1.4 (0.52–3.65) |
| 35–39                | 28 (19)   | 32 (12)     | 2.9 (1.41–5.96) | 4.1 (1.35–12.46)** |
| 40–44                | 16 (10.88)| 32 (12)     | 1.7 (0.75–3.65) | 1.1 (0.34–3.71) |
| 45+                  | 13 (8.8)  | 33 (12.4)   | 1.3 (0.62–2.32) | 1.3 (0.37–4.23) |
| No. of life time sexual partners | |               |               |               |
| None                 | 4 (2.7)   | 28 (10.5)   | 1             | 1             |
| One                  | 49 (33.3) | 77 (28.9)   | 4.4 (1.47–13.47) | 4.0 (0.86–18.59) |
| Two                  | 46 (31.3) | 98 (36.8)   | 3.3 (1.08–9.9)  | 6.0 (1.28–28.02)** |
| More than two        | 48 (32.7) | 61 (22.9)   | 5.5 (1.80–16.7) | 5.2 (1.08–24.76)** |
| Presence of HIV infected HH member | |               |               |               |
| Yes                  | 16 (10.9)| 51 (18.7)   | 1             | 1             |
| No                   | 131 (89.1)| 215 (81.3) | 1.9 (1.06–3.54) |               |
| Presence of HIV care attendee | |               |               |               |
| Yes                  | 14 (9.5) | 44 (16.5)   | 1             |               |
| No                   | 133 (90.5)| 222 (83.5) | 1.8 (1.1–3.56)  |               |
| Witnessed stigma     |           |             |               |               |
| Low stigma           | 91 (61.9)| 184 (69.2)  |               |               |
| High stigma          | 56 (38.1)| 82 (30.8)   | 1.4 (0.90–2.10) |               |
| Depression           |           |             |               |               |
| Not depressed        | 56 (38.1)| 154 (57.9)  | 1             |               |
| Depressed            | 91 (61.9)| 112 (42.1)  | 2.2 (1.47–3.37) |               |
| Level of social support |       |             |               |               |
| Poor social support  | 103 (70)| 95 (35.7)   | 4.2 (2.73–6.49) | 2.3 (1.26–4.30)** |
| Good social support  | 44 (30)| 171 (64.3)  | 1             |               |
| Wealth quintile (SES) |         |             |               |               |
| Lowest               | 40 (27.2)| 42 (15.8)   | 3.2 (1.63–6.37) | 1.05 (0.38–2.83) |
| Second               | 39 (20.4)| 47 (17.7)   | 2.8 (1.43–5.52) | 3.3 (1.31–8.46)** |
| Third                | 24 (16.3)| 57 (21.4)   | 1.4 (0.70–2.90) | 0.8 (0.27–2.31) |
| Fourth               | 26 (17.7)| 59 (22.2)   | 1.5 (0.74–3.0)  | 1.1 (0.44–2.82) |
| Highest              | 18 (12.2)| 61 (22.9)   | 1             |               |
| Disclosure to partner|           |             |               |               |
| Yes                  | 26 (35.6)| 72 (59)     | 1             |               |
| No                   | 47 (64.4)| 50 (41)     | 2.6 (1.43–4.74) | 2.0 (1.05–4.14)** |
| HIV support groups in community | |               |               |               |
| Yes                  | 70 (47.6)| 150 (56.4)  | 0.70 (0.47–1.05) |               |
| No                   | 77 (52.4)| 116 (43.6)  | 1             |               |
Ethiopia, seeking treatment related to sexual transmitted disease is still lack. Socioeconomic positions of the study participants were also the determinant factors to present late for HIV care. Participants in the second (next to the lowest) wealth quintile were statistically associated with late presentation. This was also consistent with previous systematic review of three indicators of socio economic status (education, income and occupation) [26]. Despite the difference in measurement of socioeconomic positions of HIV positive individuals, some studies also describe income as a determinant factor for late presentation [6, 14, 17].

In the context of Ethiopian health care delivery system voluntary counseling and testing, diagnosis and ART services are exempted.

In Ethiopia people are most of the time living together; shares the same dish and chalice in different occasions. Participants with poor social support were more likely present late, consistent with studies done in Durban, South Africa [14] and Houston, Texas [27]. Here we believe that social stigma and lack of social support can contribute towards people feeling inhibited in seeking HIV/AIDS care. The qualitative data also support this finding. Behavioral change and communication concerned with social stigma and poor social support needs to be done using key informants, religious person and mother supporting groups.

Poor partner’s communication on reproductive health matters has an impact for health status of the family. Partners who did not disclose their status to their partner were more likely to present late. Similarly, studies done in Uganda [6], Kenya [28] and Ethiopia [17], revealed that disclosure to partners can initiate timely HIV/AIDS care. HIV/AIDS related stigma and discrimination has declined dramatically in Ethiopia and support following disclosure has improved.

The current study reported that participants who had been visiting health facilities in recent years were more likely to present early as compared to those visited health facilities before 2008. This finding is consistent with studies done in Nigeria [29], Belgium and France [22], New York City [30] and India [23]. This could be due to the increased access to care, overall awareness of HIV, media accessibility and a reduction in stigma over time [31–33].

Fear of stigma and losing one’s job were determinant factors for late presentation consistent with previous studies in Sub-Saharan Africa [34] and Zimbabwe [35]. This is also supported by the qualitative FGD report that

| Determinants/factors                  | Presentation to HIV care | COR (95 % CI) | AOR (95 % CI) |
|--------------------------------------|--------------------------|---------------|---------------|
|                                      | Cases (%)                | Control (%)   |               |
| Diet and life style change for positive result |                          |               |
| Yes                                  | 49 (33.3)                | 122 (45.9)    | 0.59 (0.39–0.89) | 0.45 (0.24–0.87)* |
| No                                   | 98 (66.7)                | 144 (54.1)    | 1             | 1             |
| Desire to protect family             |                          |               |
| Yes                                  | 23 (15.6)                | 126 (43.4)    | 0.20 (0.12–0.34) | 0.19 (0.09–0.37)** |
| No                                   | 124 (84.4)               | 140 (52.6)    | 1             | 1             |
| To know CD4 count                    |                          |               |
| Yes                                  | 5 (3.4)                  | 33 (12.4)     | 0.25 (0.095–0.65) | 0.37 (0.09–1.43) |
| No                                   | 142 (96.6)               | 233 (87.6)    | 1             | 1             |
| Severity of illness                  |                          |               |
| Yes                                  | 89 (60.5)                | 66 (24.8)     | 4.7 (3.01–7.16) | 4.3 (2.26–8.0)** |
| No                                   | 58 (39.5)                | 200 (75.2)    | 1             | 1             |
| Fear of stigma                       |                          |               |
| Yes                                  | 94 (63)                  | 65 (24.5)     | 5.5 (3.5–8.5)  | 4.4 (2.2–8.3)** |
| No                                   | 53 (37)                  | 201 (75.5)    | 1             | 1             |
| Fear of disclosure                   |                          |               |
| Yes                                  | 60 (40.8)                | 40 (15)       | 3.9 (2.43–6.23) | 2.0 (0.99–4.32) |
| No                                   | 87 (59.2)                | 226 (84.9)    | 1             | 1             |
| Fear of losing job/income source     |                          |               |
| Yes                                  | 27 (18.4)                | 6 (2.3)       | 9.8 (3.92–24.2) | 6.8 (1.8–24.54)* |
| No                                   | 120 (81.6)               | 260 (97.7)    | 1             | 1             |

* Significant (p ≤ 0.05)  
** Highly significantly (p < 0.001)
showed fear of stigma and losing job/customers were barriers. This is could be common problem of female participant’s sex worker.

Our study also showed that participants who perceived HIV as a sever disease were more likely to seek care early. This is demonstrated in the qualitative data in which protecting family members was a driver to initiate HIV care early.

In this study the use of traditional medicine and a holy water as a treatment and sex of respondents were not statistically significant with late presentation to HIV/AIDS care. However, data from the FGD indicates that male’s patients who had visited traditional medicine and/or holy water sites were more likely to present late for HIV/AIDS care. This discrepancy could be due to that HIV positive individuals might fear to disclose the utilization of these services. It could be also due to the rareness of such traditional treatments.

The potential limitations of this study were that the study may have been prone to recall biases and that there may have been miscategorization of presentation or disease do to social pressure.

**Conclusion**

Age older than 25, having multiple sexual partners, poor socioeconomic status, non-disclosure to partner, presentation before 2011 for care, low house hold social support, desire to protect family, severity of illness, fear of stigma and fear of losing job were all found to be independent risk factors for late presentation to HIV/AIDS care.

**Authors’ contributions**

GHS designed the study, performed the statistical analysis, and drafted the paper. YAG and AAA participated in the paper writing. YAG, AAA and KAA participated in manuscript drafting and editing. All authors contributed to the data analysis. All authors read and approved the final manuscript.

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Acknowledgements
The Southern Tigre zonal Health Department, hospitals’ and Health centers’ staff, study participants, and data collectors deserve appreciation for their cooperation and assistance.

Competing interests
The authors declare that they have no competing interests.

Received: 26 June 2015 Accepted: 9 November 2015
Published online: 02 December 2015

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