ORIGINAL RESEARCH

Comparison of health system responsiveness between HIV and non-HIV patients at infectious disease clinics in Yunnan, China

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Background: China is in an epidemiologic transition period. Health system responsiveness (HSR) has become an increasing concern in China. With the burden of increasing human immunodeficiency virus (HIV) infection/acquired immune deficiency syndrome, responsiveness of HIV care is urgently needed. We aimed at comparing the experience of HSR between HIV-positive and non-HIV patients.

Methods: A cross-sectional study was carried out in Yunnan, China, from January to February 2015 among two consecutive groups of HIV and non-HIV patients in two hospitals with the largest HIV admissions. Patients' experience and expectation of HSR were measured using a self-reported questionnaire containing items of seven domains and 35 vignettes (five per domain). Each of the items and vignettes was ranked from 1 "very good" to 5 "very bad." For each domain, B-scales were built based on the difference between experience and the vignettes. Ordered probit and censored ordered probit regression models were constructed to compare HSR experience between the two groups adjusted for socioeconomic status (SES) factors.

Results: The majority of HIV patients were at clinical stage 1, were infected via unprotected sexual contact, and had a CD_4 count <500 cells/μL. After adjustment by SES factors, HIV patients had better experiences of HSR in six of the seven HSR domains, prompt attention being the only domain that non-HIV patients had better experiences.

Conclusion: Perceptions of HSR experience were better among HIV patients except for prompt attention, which could not be explained by SES factors and difference in expectations. A reform is needed not to neglect the needs of non-HIV patients in the study area.

Keywords: health system responsiveness, anchoring vignettes, HIV care, China

Introduction

China is in an epidemiologic transition period. The quality of health care faces noteworthy challenges, especially due to nonclinical determinants such as patients' perceptions of their experience in clinics. Public perceptions of responsiveness, trustworthiness, and quality are low. One study revealed that about 55% of residents from the lowest and highest income quintile groups were not satisfied with inpatient services.[1] The quality of mental health care has been shown to be significantly associated with dignity and basic amenities.[2] With the serious burden of increasing human immunodeficiency virus infections and acquired immune deficiency syndrome (HIV/AIDS), responsiveness of HIV care is an urgent public health concern.

On the one hand, there are low levels of responsiveness in HIV care. A study from China showed that health care providers did not offer adequate emotional support to HIV patients, whereas nurses could not provide normative HIV care.[3] On the

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other hand, there have been attempts to improve the quality of HIV/AIDS care. Another study suggested that an expert system for HIV voluntary counseling could increase patients' self-efficacy and knowledge.[4] However, HIV patients still suffer from indignity and incompetent service and lack the required social support.

Since 2011, there has been an advocacy of "zero discrimination" to eliminate discrimination and stigmatization.[5] However, >50% of people living with HIV/AIDS are still fearful of disclosing their infectious status, while almost 80% are afraid of being blamed and are simply refused health care.[6] For HIV patients who bear psychosocial problems such as perceived discrimination, health system responsiveness (HSR) has rarely been addressed in HIV care, especially in China. It is therefore important to compare HSR among HIV and non-HIV patients to meet patients' needs.

HSR is a promising measure of the quality of a health system and focuses on a health care system's ability to satisfy patients' expectations in terms of nonfinancial aspects of health care and nonclinical health domains such as dignity, confidentiality, autonomy, prompt attention, the quality of basic amenities, social support, and choice of provider.[7] It may promote the use of services[8,9] and ultimately promote health. One study from Ethiopia found that HSR was independently associated with satisfaction of HIV care,[10] while another study suggested that HSR was related to increasing visit adherence.[11] Some domains of HSR such as prompt attention, communication, and autonomy were identified as priority areas to improve responsiveness of health care services.[12,13] However, these studies did not compare differences of HSR between HIV and non-HIV patients. Our previous study showed that the expectations of HIV patients among the eight domains were lower than that of non-HIV patients, and the assessment of HSR based on HIV patient's perceptions may give biased results toward the quality of HIV services.[14] Thus, studies are needed to compare differences in HSR based on patients' experience of health care service simultaneously.

The self-rated behavior of HSR is systematically biased by demographic, socioeconomic, or cultural factors. A challenge to comparing self-reported responsiveness results is known as "reporting behavior heterogeneity,"[15] "differential item functioning (DIF),"[16] and "response category cut-point shift."[17] Anchoring vignettes have been proposed to address these problems.[17–19] Although anchoring vignettes have been applied to HSR in different settings,[20,21] it has not been used to assess HSR across HIV and non-HIV patients to measure the equity of outpatient services.

The main aim of this study was therefore to compare experiences of HSR between HIV and non-HIV patients. It is well known that the two groups are different in terms of socioeconomic status (SES) and expectations on HSR. Thus, the comparison will be adjusted for these two factors.

Methods
Study setting and design
A cross-sectional study was conducted in infectious departments of two large hospitals in Kunming, Yunnan province, China. These two hospitals have the largest number of admissions of HIV and non-HIV-infectious patients in Yunnan.[14]

Subjects
Eligible patients in this study were HIV and non-HIV inpatients and outpatients aged ≥15 years by consecutive sampling.[14] By arrangement of the hospitals, the majority of non-HIV-infectious patients were hepatitis patients. HIV patients with tuberculosis were excluded as they received different services from ordinary non-HIV health care. Those who could not communicate in Mandarin or were too ill to be interviewed were also excluded. Consecutive sampling was used to recruit study subjects.[14]
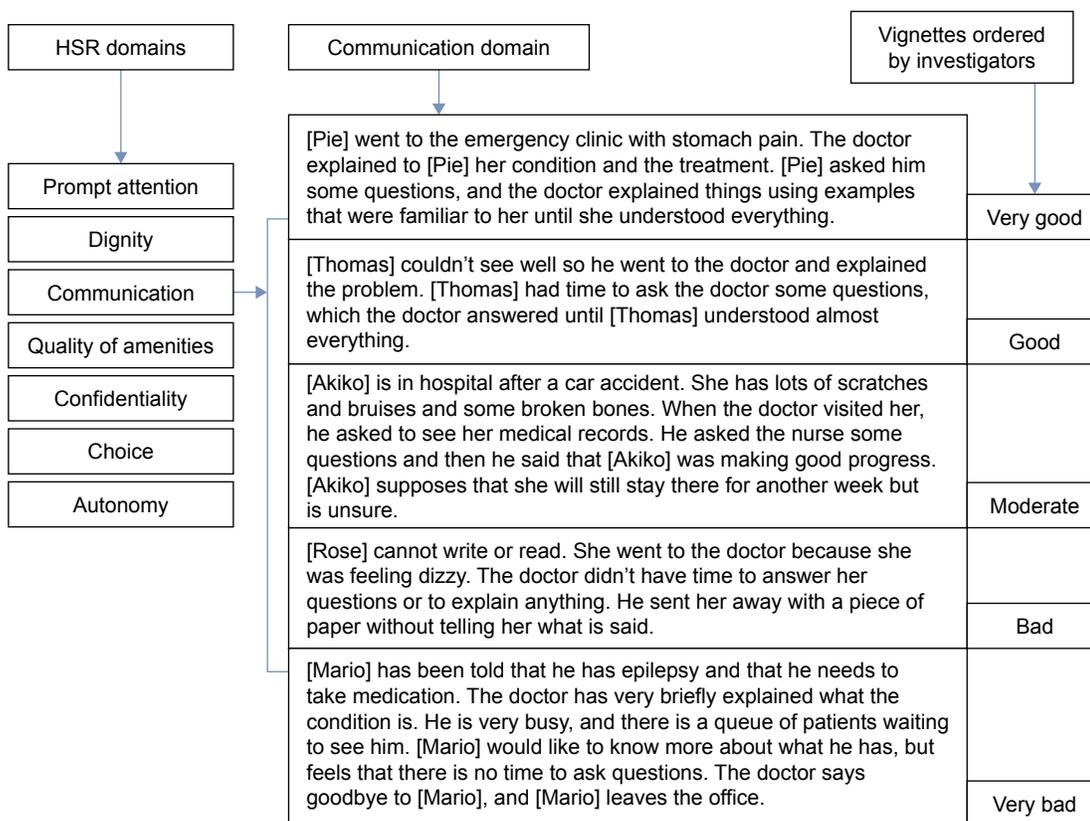
Sample size
Sample size estimation used the formula for comparing two population proportions. The percentages of patients who rated the communication domain as "good" among HIV and non-HIV patients in a pilot study were 53% and 61%, respectively. The number of subjects needed to detect a difference of 8% in the proportion of rating communication as "good" between the two groups, with 95% confidence and 80% power, would be 625 per group. To compensate for an estimated 10% nonresponse rate, the sample size was increased to 694 per group.

Development and modification of vignettes
The vignettes were developed and modified which was adopted from World Health Organization in accordance with our previous study.[14] Figure 1 shows the framework of HSR in seven domains, with an example vignette shown for communication.

Study variables and measurements
The dependent variable was the self-rated experience of HSR in seven domains. The main independent variable was HIV status confirmed by Western blot test. Demographic and socioeconomic variables collected included age, gender, ethnicity, religious affiliation, place of residence, marital

HSR domains	Communication domain	Vignettes ordered by investigators

	[Pie] went to the emergency clinic with stomach pain. The doctor explained to [Pie] her condition and the treatment. [Pie] asked him some questions, and the doctor explained things using examples that were familiar to her until she understood everything.	Very good
Prompt attention		
Dignity	[Thomas] couldn't see well so he went to the doctor and explained the problem. [Thomas] had time to ask the doctor some questions, which the doctor answered until [Thomas] understood almost everything.	Good
Communication		
Quality of amenities		
Confidentiality	[Akiko] is in hospital after a car accident. She has lots of scratches and bruises and some broken bones. When the doctor visited her, he asked to see her medical records. He asked the nurse some questions and then he said that [Akiko] was making good progress. [Akiko] supposes that she will still stay there for another week but is unsure.	Moderate
Choice		
Autonomy		
	[Rose] cannot write or read. She went to the doctor because she was feeling dizzy. The doctor didn't have time to answer her questions or to explain anything. He sent her away with a piece of paper without telling her what is said.	Bad
	[Mario] has been told that he has epilepsy and that he needs to take medication. The doctor has very briefly explained what the condition is. He is very busy, and there is a queue of patients waiting to see him. [Mario] would like to know more about what he has, but feels that there is no time to ask questions. The doctor says goodbye to [Mario], and [Mario] leaves the office.	Very bad

Figure 1 Framework of HSR, vignette example, and vignette ordering by investigators.
Abbreviation: HSR, health system responsiveness.

status, family size, education, occupation, and household income, which measurements were in consistent with our previous study.[14] Among them, occupation, education, and income were on conventionally reflecting SES.

Data collection

HSR data were collected from 1 January to 15 February 2015. The team of interviewers consisted of the main research investigators, HIV/AIDS specialists, and local medical students. Prior to data collection, all interviewers were given training based on concepts of HSR, dimensionality of each domain, meaning of each vignette, common symptoms of HIV/AIDS, psychological support, and investigation skills and protocol for emergency situations. Eligible patients were interviewed face-to-face using an individual questionnaire. Among them, experiences of HSR were self-reported, whereas vignettes were read by the investigators. Each patient was given a gift valued at 10 RMB as compensation for their time.

Statistical methods

B-scale computation

B-scale computation is an approach that was used to calculate the proportions of HSR's experiences adjusted for expectations by vignettes. B-scale is set as the scale of self-assessments relative to vignettes in a nonparametric setting.[22]

Let y_i be the HSR of the self-assessment and $z_{i1}, ..., z_{iJ}$ be vignettes (1–J) for the ith respondent. With successively ordered ranks ($z_{j-1} < z_j$, for $j = 2, ..., J$) to each respondent on all vignettes, we created the DIF-corrected self-assessment C_i:

$$
C_i = \begin{cases} 1 & \text{if } y_i < z_{i1} \\ 2 & \text{if } y_i = z_{i1} \\ 3 & \text{if } z_{i1} < y < z_{i2} \\ \vdots \\ 2J+1 & \text{if } y_i > z_{ij} \end{cases}
$$

Values of C that are intervals represent the set of inequalities. Under two assumptions of response consistency and vignette equivalence, the C-scale is used to ensure credible comparisons.[22]

Based on the same method as the C-scale, a B-scale was built. The difference between these scales lies in information that exists when a self-grading response is tied with the grading of an anchoring object, $y_i = v_{ij}$. The C-scale makes strict comparisons with adjacent rank orderings.[23] The B-scale states

less information in the occurrence of a tie, represented as a set of B-scale values rather than a single index value.[23] If $y_i = v_{i1}$, then $B_i = \{1, 2\}$, if $y_i = v_{i2}$, then $B_i = \{2, 3\}$. The advantage of the B-scale is that it does not rely on cut-point locations and as a result provides credible comparisons without the requirement of interval equivalence or vignette equivalence.[23]

Vignette ordering

The ordering of the vignettes is important before the construction of the B-scale. It is normally chosen by the researchers and also possible to draw upon a consensus ordering by the respondents, so long as only one ordering is used for all respondents in the analysis.[22] However, differences between hypothesized ordering by the researchers and the consensus ordering may be used for diagnosing problems in the survey instruments, particularly when translating the questions for use in different languages.[22] Thus, we confirmed vignette ordering for the construction of B-scales and censored ordered probit regression (COPR) models.

Data analysis

The comparison of sample characteristics between HIV-positive and non-HIV patients was performed using χ^2

goodness-of-fit tests for categorical variables.[14] Figure 2 shows the subsequent analysis of experience and HSR vignettes. After vignette ordering (Figure 1), the distributions of experience and B-scales of HSR were described, and ordered probit regression models (OPR) and COPR models were conducted. OPR models were constructed separately for each domain to compare differences of self-reported experiences of HSR between HIV and non-HIV patients before and after adjustment of demographic and socioeconomic factors. COPR models were used to compare B-scale values of HSR before and after adjustment of demographic and socioeconomic factors. Variables with a p-value <0.05 were considered as significant. All the analyses were performed using R language and environment with emphasis on the "anchors" package.[22,24]

Ethical considerations

The study was approved by Prince Songkla University Institutional Review Board and Kunming Medical University.[14] Anonymity of the data was assured, and the participants were requested to give their consent to participate by signing an informed consent form, after providing them with detailed information on the study procedures.[14] It was approved that subjects aged <18 years could provide the consent by themselves.
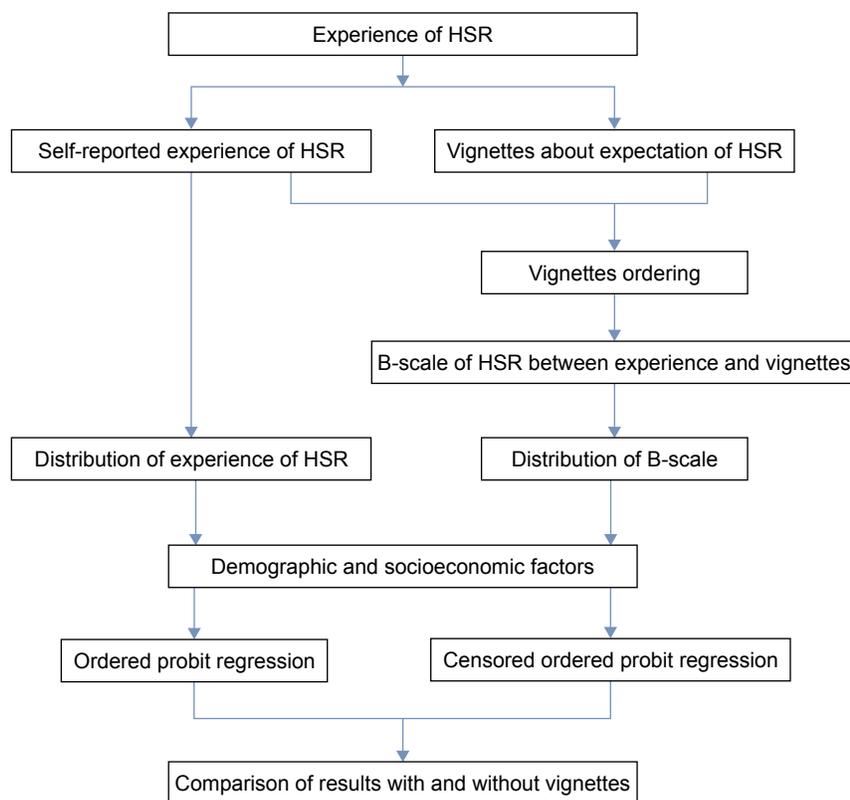
Figure 2 Framework of measurement and analysis about HSR experience and vignettes.
Abbreviation: HSR, health system responsiveness.

Results

Of the 800 consecutive eligible HIV patients approached, 696 (87%) consented to attend the study, while 699 (66%) of the 1,059 non-HIV patients invited agreed to join the study. Most of the HIV patients who refused to participate stated heavy internalized stigma as the reason for not joining, whereas their counterparts refused mainly because they thought that the study was not relevant to them.

Demographic and socioeconomic characteristics

Majority of both groups of patients were male, of Han ethnicity, married or cohabiting, and employed and had no religious affiliation. About half achieved a junior high school level of education, had a monthly household income of ≤5,000 RMB and were living in a family of two to four members. Both groups were closely matched on gender; however, HIV-positive patients were more likely to belong to a minority ethnicity; have a religious affiliation; live in a rural area; have a higher education level; be separated, divorced, or widowed; have a lower household income; live with fewer family members; and be self-employed.

Clinical characteristics

Table 1 presents the clinical characteristics of HIV patients. The route of HIV transmission among HIV-positive patients was mainly via unprotected sexual contact, accounting for 77.7%. The majority of them were at clinical stage 1, were not tested for virus load, and missed their antiretroviral therapy (ART) dose in the last 7 days. In almost 90% of the patients, the CD_4 count was <500 cells/μL, and the majority were followed up between two and four times in the first 3 months after confirmation of HIV/AIDS. The median virus load was 89,377.5 copy/mL among those who were tested, and the median number of days between HIV diagnosis and receiving the first dose of ART was 293. The majority of non-HIV patients had hepatitis (85.7%).

Experience of HSR among HIV and non-HIV patients

Table 2 shows the distribution of experiences of HSR among HIV and non-HIV patients. The majority of HIV patients perceived having a "good" experience in all seven HSR domains. Majority of non-HIV patients perceived having a "good" experience in three HSR domains: prompt attention, dignity, and communication, while four domains were perceived as "moderate": quality of basic amenities, confidentiality, choice, and autonomy. The difference of proportional trends

Table 1 Clinical status among HIV-positive patients

Variables of clinical status	HIV patients	
	n	%
Days between HIV diagnosis and ART		
Median (range)	292.6	(0, 4,745)
Route of transmission		
Unprotected sex	541	77.7
Sharing injection equipment	107	15.4
Mother-to-child	22	3.2
Unknown	26	3.7
Clinical stage		
Stage 1	389	55.9
Stage 2	160	23.0
Stage 3	100	14.4
Stage 4	47	6.8
CD_4 count		
<200	305	43.8
200–499	337	48.4
≥500	54	7.8
History of virus load testing		
No	558	80.2
Yes	138	19.8
Distribution of virus load		
Median (range)	89 378	(50, 7,060,000)
Treatment of opportunistic infections		
No	624	89.7
Yes	72	10.3
Number of follow-up visits in the first 3 months		
0	15	2.2
1	51	7.3
2	240	34.5
3	193	27.7
4	197	28.3
Missed ART in the last 7 days		
No	223	32.0
Yes	473	68.0

Abbreviations: ART, antiretroviral therapy; HIV, human immunodeficiency virus.

from the OPR models were significant in all domains except for prompt attention, indicating that non-HIV patients were more likely to have a worse experience for these six HSR domains. After adjustment for sociodemographic factors, the differences were still significant among the same six HSR domains.

Experience of HSR after adjusting for vignettes among HIV and non-HIV patients

Table 3 presents B-scale values between self-rated HSR and vignettes in seven domains. B-values ranged from 1 to 6, since there were five vignettes, reflecting more than "very good" to less than "very bad." Among HIV patients, the highest probabilities mainly concentrated around B-values of 2 reflecting experiences between "very good" and "good" for four domains: prompt attention, dignity, communication,

Table 2 Distribution and ordered probit regression results of experience of HSR before and after adjusting for sociodemographic factors among HIV-positive and non-HIV patients

| HSR domain | Patient group | Perceived experience | | | | | | | | | | Ordered probit regression | | | | | | | |
| | | Very good | | Good | | Moderate | | Bad | | Very bad | | Crude | | | | Adjusted | | | |
		n	%	n	%	n	%	n	%	n	%	β	SE	OR	95% CI	β	SE	OR	95% CI
Prompt attention	HIV	83	11.9	306	44.0	228	32.8	67	9.6	12	1.7	−0.11	0.13	0.90	(0.70, 1.15)	−0.16	0.11	0.85	(0.69, 1.05)
	Non-HIV	21	3.0	442	63.2	206	29.5	21	3.0	9	1.3								
Dignity	HIV	168	24.1	362	52.0	129	18.5	25	3.6	12	1.7	0.69	0.13	1.99	(1.54, 2.58)	0.63	0.12	1.88	(1.48, 2.40)
	Non-HIV	42	6.0	483	69.1	163	23.3	9	1.3	2	0.3								
Communication	HIV	179	25.7	352	50.6	139	20.0	19	2.7	7	1.0	0.58	0.13	1.79	(1.39, 2.31)	0.6	0.11	1.83	(1.48, 2.27)
	Non-HIV	49	7.0	455	65.1	177	25.3	13	1.9	5	0.7								
Quality of amenities	HIV	135	19.4	335	48.1	180	25.9	33	4.7	13	1.9	3.16	0.16	23.65	(17.35, 32.54)	2.99	0.14	19.88	(15.11, 26.43)
	Non-HIV	10	1.4	26	3.7	445	63.7	201	28.8	17	2.4								
Confidentiality	HIV	169	24.3	352	50.6	145	20.8	21	3.0	9	1.3	3.36	0.16	28.66	(20.87, 39.76)	3.21	0.14	24.85	(18.81, 33.16)
	Non-HIV	10	1.4	43	6.2	491	70.2	149	21.3	6	0.9								
Choice of providers	HIV	136	19.5	332	47.7	192	27.6	30	4.3	6	0.9	3.14	0.16	23.01	(16.80, 31.83)	3.16	0.15	23.68	(17.57, 32.24)
	Non-HIV	11	1.6	32	4.6	494	70.7	152	21.7	10	1.4								
Autonomy	HIV	167	24.0	354	50.9	138	19.8	29	4.2	8	1.1	3.27	0.16	26.39	(19.25, 36.54)	3.22	0.15	25.05	(18.87, 33.62)
	Non-HIV	11	1.6	31	4.4	479	68.5	165	23.6	13	1.9								

Abbreviations: HIV, human immunodeficiency virus; HSR, health system responsiveness.

and confidentiality. The highest probabilities of basic amenities and autonomy domains had B-scale values of 3 reflecting experiences between "good" and "moderate" and 1 reflecting experiences more than "very good." In contrast, the experience of HSR after adjusting for vignettes among non-HIV patients was generally lower than that among HIV patients. The differences of rank probabilities were significant in all seven domains before and after adjusting for sociodemographic factors. In prompt attention, non-HIV patients were less likely to have a worse experience than HIV patients. However, non-HIV patients were more likely to have a worse experience than HIV patients in dignity, communication, quality of basic amenities, confidentiality, choice of providers, and autonomy domains.

Discussion

HIV patients had better experiences about self-rated HSR in six HSR domains, prompt attention being the only exception, after adjustment for demographic and socioeconomic factors. After adjusting for anchoring vignettes, HIV patients still had better perceptions of experiences about HSR in these six domains. Compared with OPR models with no adjustment for vignettes, all the coefficients reduced in COPR models, reflecting more narrow and valid differences among HIV and non-HIV patients.

Perceptions about experience among HIV patients were better than those of their non-HIV counterparts in six domains such as dignity, communication, quality of basic amenities, confidentiality, choice of provider, and autonomy. Many studies among HIV patients showed "logistic choices" to providers or hospitals and lack of dignity without admiration for individual autonomy as medical participation and self-decisions in HIV care.[25,26] HIV patients kept more appointments when treated with dignity and patient-centered communication because of communication preferences and patient satisfaction.[27,28] Conversely, one study showed that HIV patients were highly satisfied with pharmaceutical services.[29] A possible explanation for the finding that HIV patients perceived better HSR than non-HIV patients in this study may reflect the successful evolvement of HIV care in the country. Good care given to HIV patients, good treatment efficacy of highly active ART, and the integration of community and public HIV services[30,31] are part of an attempt to control the spread of HIV. HIV prevention has steadily been supported first by internal findings such as Global Fund and has recently become internalized.[32] Studies in China recently focused on a scaling-up to increase the number of individuals knowing their HIV status and improving access

Table 3 COPR results for experience and vignettes of HSR before and after adjusting for sociodemographic factors among HIV-positive and non-HIV patients

HSR domain	Patient group	B-value												COPR			
		1		2		3		4		5		6		Before		After	
		n	Pr.	n	Pr.	n	Pr.	n	Pr.	n	Pr.	n	Pr.	β	SE	β	SE
Prompt attention	HIV	49	0.070	493	0.710	35	0.050	88	0.130	0	0.000	31	0.040	−0.44	0.09	−0.52	0.08
	Non-HIV	33	0.048	575	0.840	55	0.080	2	0.003	1	0.001	17	0.020				
Dignity	HIV	63	0.091	485	0.697	18	0.026	104	0.149	7	0.010	19	0.027	**0.38**	0.09	**0.33**	0.07
	Non-HIV	21	0.030	471	0.684	33	0.048	97	0.141	65	0.094	2	0.003				
Communication	HIV	85	0.122	483	0.694	71	0.102	39	0.056	4	0.006	14	0.020	**0.25**	0.09	**0.23**	0.08
	Non-HIV	95	0.141	28	0.041	529	0.783	8	0.012	1	0.001	15	0.022				
Quality of basic amenities	HIV	116	0.167	25	0.036	527	0.757	4	0.006	2	0.003	22	0.032	**1.13**	0.10	**1.08**	0.08
	Non-HIV	2	0.003	20	0.029	581	0.854	4	0.006	59	0.087	14	0.021				
Confidentiality	HIV	148	0.213	517	0.744	7	0.010	1	0.001	0	0.000	22	0.032	**1.16**	0.10	**1.03**	0.08
	Non-HIV	22	0.032	603	0.874	3	0.004	0	0.000	18	0.026	44	0.064				
Choice	HIV	535	0.769	121	0.174	–	–	10	0.014	–	–	30	0.043	**1.60**	0.10	**1.44**	0.08
	Non-HIV	24	0.034	117	0.167	–	–	520	0.744	–	–	38	0.054				
Autonomy	HIV	155	0.223	6	0.009	513	0.737	5	0.007	0	0.000	17	0.024	**1.64**	0.11	**1.50**	0.09
	Non-HIV	10	0.015	4	0.006	569	0.827	21	0.031	2	0.003	82	0.119				

Note: "–" means calculation of B-scale was not possible. Bold figure= *p*-value <0.05.
Abbreviations: COPR, censored ordered probit regression; HIV, human immunodeficiency virus; HSR, health system responsiveness; Pr., probability.

to HIV-related services.[33,34] However, non-HIV health care is overwhelmed by several problems including inequalities of health care utilization and high out-of-pocket payments due to high workloads and inadequate budgets.[35,36] In 2012 in China, the wealthiest 20% of the rural and urban populations contributed 49.7% and 55.8% of the total health expenditure, respectively, while the poorest 20% contributed only 4.7% and 4.4%, respectively.[37] This finding indicates a need to improve care for ordinary patients in general.

However, HIV patients had worse perceptions about experience of prompt attention compared with their counterparts. There has been no previous study comparing the experience of HSR between HIV and non-HIV patients. One study in South Africa showed that prompt attention had the lowest degree of perceived responsiveness among older adults admitted to hospital.[12] Prompt attention may be seen as a priority domain to improve HSR. There is probably a shortage of human resources and an efficient mechanism to allow health personnel to uniformly cooperate with each other in HIV/AIDS care.[38,39]

Therefore, it may be to promote commonization,[40] which, on the one hand, guarantees HIV care and improves ordinary health care service, on the other hand, in other words, it may be better to integrate HIV services into routine care sharing the same medical resources and education.

Anchoring vignettes were used to narrow the differences in perceptions of HSR experiences between HIV and non-HIV patients, thus controlling for patients' own expectations. Our results are consistent with a study by Grol-Prokopczyk et al,[41] indicating that using anchoring vignettes to adjust for self-rated HSR is valid. Our vignettes were comprehensible to the patients and showed minimal violation of the assumptions. Thus, using anchoring vignettes may be a valid method to measure perceptions of HSR to control for DIF to avoid incorrect research findings.

There are certain limitations in our study. First, a poorer response rate among the non-HIV group may affect the internal validity of the study.[42] However, this imbalance was in the same direction of the main results in which non-HIV patients perceived poorer HSR. Despite the findings in favor of HIV care, the generalizability of this study is still limited because the data were collected from only two hospitals in one province of China.

Conclusion

Perceptions about experiences of HSR were better among HIV patients than among non-HIV patients in all domains except for prompt attention, even after adjusting for differences in socioeconomic indicators and patients' own expectation. Commonization or integrating HIV care into the ordinary health care should be considered to improve the quality of care as a whole. A research on management trial should be initiated.

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Disclosure

The authors report no conflicts of interest in this work.

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