

# Confirmation of the factor structure of the PROQOL-HIV questionnaire in Han and Uygur HIV+ patients

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## AIMS.

The purpose of this study was to confirm the validity of the four-factor structure of the PROQOL-HIV questionnaire for measuring health-related quality of life (HRQL) in Chinese HIV-positive patients. The PROQOL-HIV questionnaire is composed of 43 items and targets 8 HRQL dimensions [1,2]. However, recent work based on a representative sample of French HIV+ patients suggested that 4 dimensions can also be used to provide a detailed account of patient's HRQL with high reliability [3].

Given the prevalence of HIV disease among at-risk populations, including injecting drug users (~9%), and the various factors associated to HIV epidemics in China [4], validating this reduced factor structure in a sample of Chinese will certainly help in providing more reliable between-group comparisons in transversal or longitudinal studies.

## METHODS.

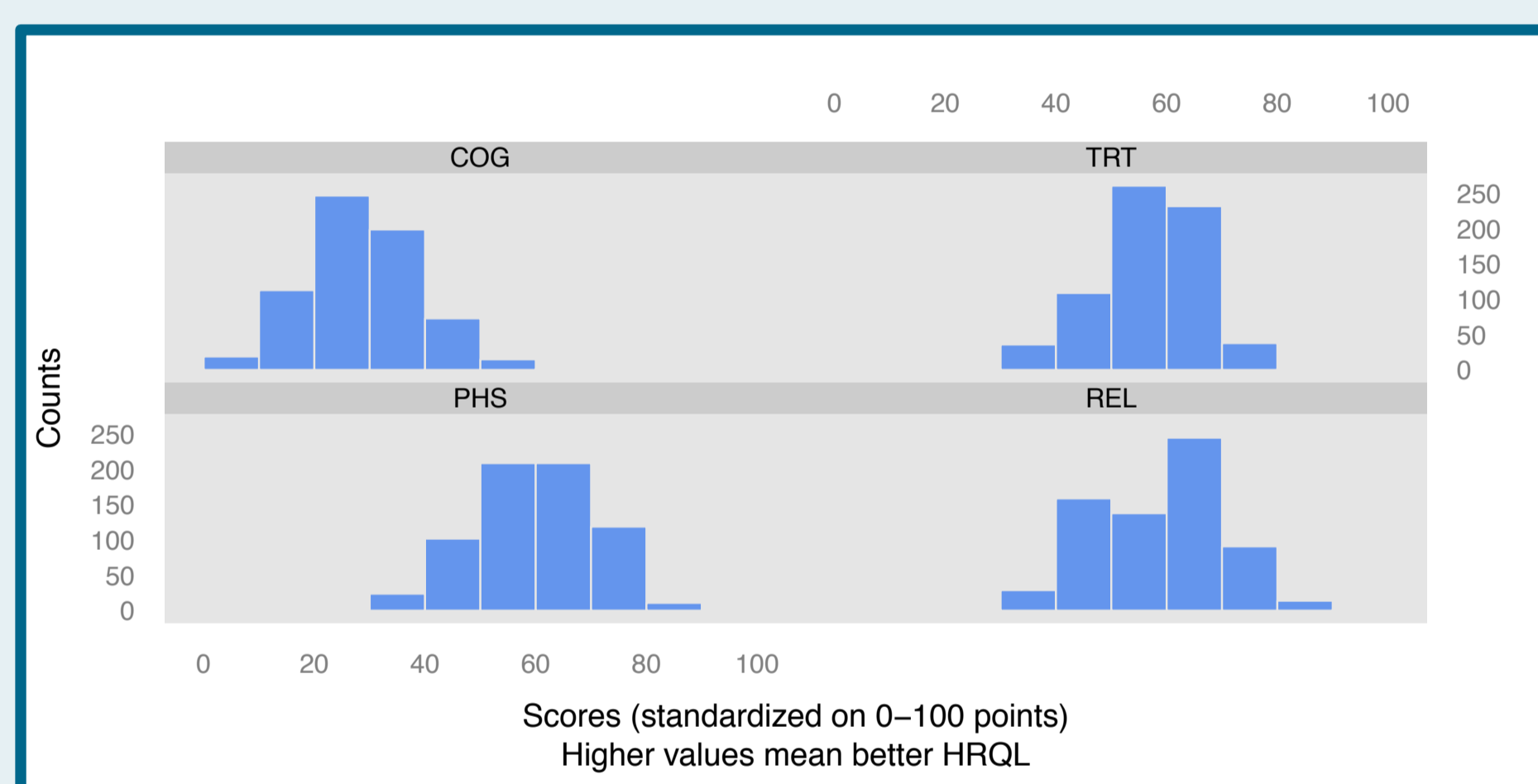
A total of 679 outpatients (age, 40 ± 9 years; 61% males; 67% IDUs) were assessed using the 43-item PROQOL-HIV questionnaire on four domains specific of HIV infection (PHS, physical health and symptoms; COG, health concerns and mental distress; REL, social and intimate relationships; TRT, treatment-related impact), where HRQL scores are summarized on a 0-100 points scale (higher scores mean a better HRQL).

A confirmatory factor analysis (CFA) was used to verify the hypothesized four-domain scaling scheme. A Multiple Indicator Multiple Cause (MIMIC) model were used to assess the equivalence of factor structure across Uygur (n = 500, 74%) and Han (n = 156, 23%) patients and to compare factor scores. Kruskal-Wallis ANOVAs were used to compare HRQL scores, and Student t-tests for group comparisons between factor scores. Statistical analyses were done in R 3.1 and Mplus 7.

## RESULTS.

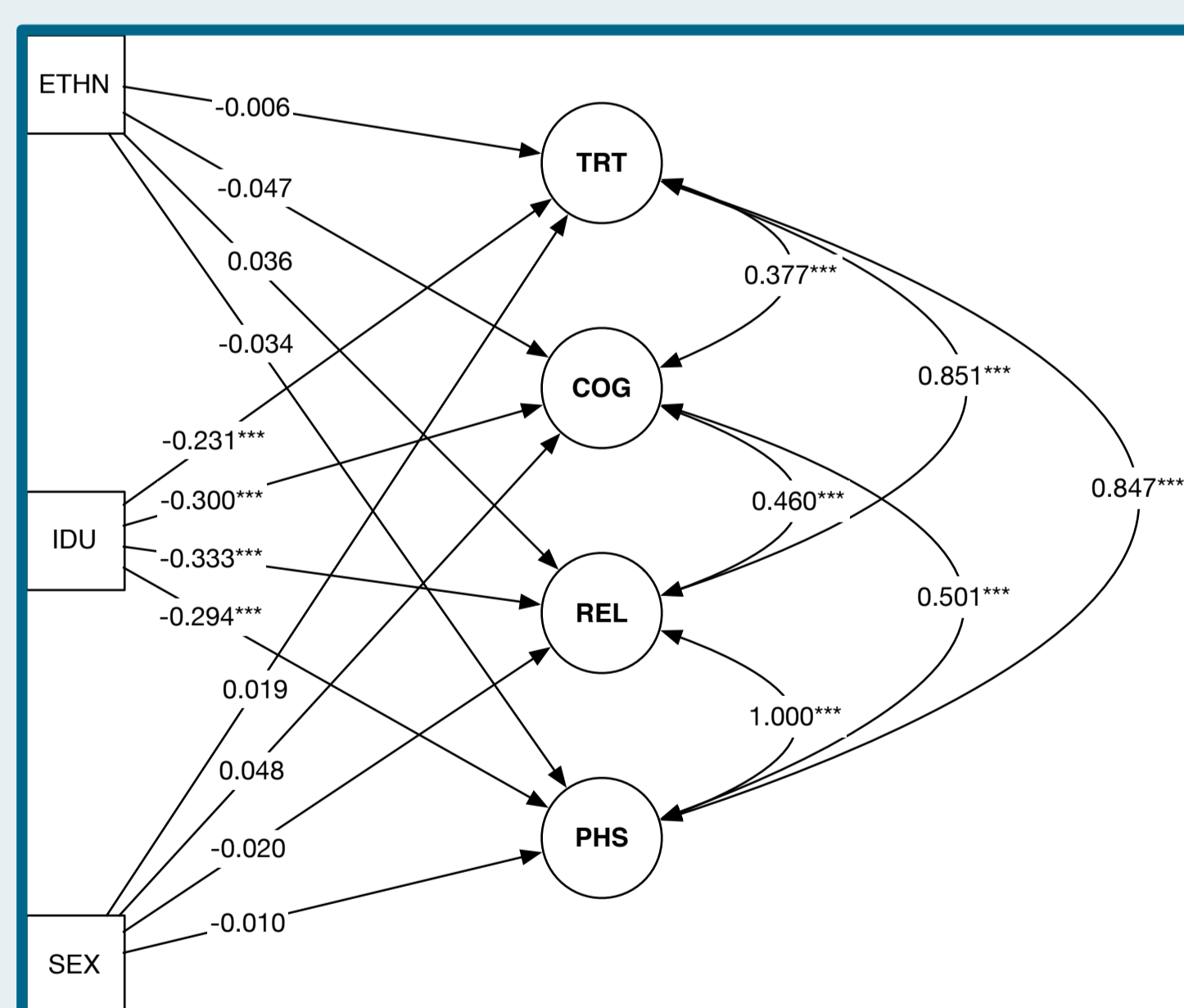
Sociodemographic and biomedical information regarding participants are summarized in **Table 1**.

Like for the international validation study, Chinese patients exhibit low HRQL compared to Western countries, but this was more pronounced on the COG dimension (PHS: 60.1 ± 10.2; REL: 58.6 ± 10.9; COG: 29.9 ± 10.2; TRT: 58.1 ± 9.2), see **Figure 1**. The 4-factor CFA indicated acceptable fit to the factor structure (RMSEA=0.029, 90% CI [0.026;0.033]; NNFI=0.795).



**Figure 1. Distribution of HRQL scores.** All scores are expressed on a 0-100 points scale, with higher values reflecting a better HRQL. Scores are binned on 10-point intervals.

**Figure 2. MIMIC path diagram.** Factor are represented as circles and persons' covariates as squares. Reference categories for the latter were as follows: ETHN = Uygur; IDU = non-IDU; SEX = Male. Statistical significance of regression paths and factor correlations follows usual convention: \*, p < 0.05; \*\*, p < 0.01; \*\*\*, p < 0.001.



**Table 1. Patients characteristics.**

Categorical variables are summarized using frequency (%) and counts. Numerical variables are summarized using three quartiles. Two-group comparisons were performed using Wilcoxon tests and Fisher chi-square.

	N	Male N = 411	Female N = 268	Combined N = 679	Test Statistic
Age	679	35 40 44	33 38 44	34 39 44	$F_{1,677} = 3, P = 0.085^1$
Pregnancy	679	0% (0)	57% (153)	23% (153)	$\chi^2_1 = 303, P < 0.001^2$
Professional activity : Active	679	36% (148)	15% (41)	28% (189)	$\chi^2_1 = 142, P < 0.001^2$
Student		4% (16)	3% (7)	3% (23)	
Housewife		0% (1)	28% (76)	11% (77)	
Retired		9% (37)	6% (15)	8% (52)	
Unemployed		51% (209)	48% (129)	50% (338)	
Study level : No study	679	7% (29)	16% (43)	11% (72)	$\chi^2_3 = 24, P < 0.001^2$
Primary		39% (159)	46% (123)	42% (282)	
Secondary		43% (178)	29% (79)	38% (257)	
University		11% (45)	9% (23)	10% (68)	
Marital status : Single	678	29% (120)	10% (27)	22% (147)	$\chi^2_3 = 60, P < 0.001^2$
Married		46% (189)	52% (139)	48% (328)	
Divorced		24% (97)	27% (71)	25% (168)	
Widowed		1% (5)	11% (30)	5% (35)	
Living mode : Alone	677	36% (148)	31% (83)	34% (231)	$\chi^2_2 = 17, P = 0.005^2$
Partner		28% (113)	28% (76)	28% (189)	
Children		8% (32)	10% (28)	9% (60)	
Partner + Children		8% (34)	16% (42)	11% (76)	
Parents		18% (74)	11% (29)	15% (103)	
Other family member		2% (9)	3% (9)	3% (18)	
Ethnicity : Han	679	29% (119)	14% (37)	23% (156)	$\chi^2_3 = 23, P < 0.001^2$
Uygur		68% (279)	82% (221)	74% (500)	
Hui		3% (12)	3% (7)	3% (19)	
Kazak		0% (1)	1% (3)	1% (4)	
Year of diagnosis	678	2006 2008 2009	2007 2008 2009	2007 2008 2009	$F_{1,678} = 3.5, P = 0.06^1$
CDC stage : C	678	43% (178)	43% (114)	43% (292)	$\chi^2_1 = 0.02, P = 0.88^2$
Mode of transmission : Homo/bisexual	668	5% (22)	0% (1)	3% (23)	$\chi^2_3 = 46, P < 0.001^2$
Heterosexual		20% (82)	42% (109)	29% (191)	
IDU		74% (303)	57% (150)	68% (453)	
Transfusion		0% (1)	0% (1)	0% (1)	
Psychiatric disorder	679	2% (7)	2% (5)	2% (12)	$\chi^2_2 = 0.02, P = 0.88^2$
Depression	679	15% (62)	14% (37)	15% (99)	$\chi^2_1 = 0.21, P = 0.64^2$
Cardiovascular disease	679	19% (80)	19% (52)	19% (132)	$\chi^2_1 = 0, P = 0.98^2$
Diabete	678	2% (10)	2% (6)	2% (16)	$\chi^2_1 = 0.03, P = 0.87^2$
Hepatitis C	679	22% (92)	21% (56)	22% (148)	$\chi^2_1 = 0.21, P = 0.65^2$
Hepatitis B	679	23% (95)	18% (49)	21% (144)	$\chi^2_1 = 2.3, P = 0.13^2$
HIV related disease	679	35% (144)	31% (84)	34% (228)	$\chi^2_1 = 0.99, P = 0.32^2$
Prophylactic	679	14% (57)	10% (27)	12% (84)	$\chi^2_1 = 2.1, P = 0.14^2$
Antidepressant	679	1% (4)	1% (3)	1% (9)	$\chi^2_1 = 0.14, P = 0.7^2$
Lipidlowering	679	3% (13)	5% (13)	4% (26)	$\chi^2_1 = 1.2, P = 0.26^2$
CD4counts	679	142 249 358	142 256 351	142 252 354	$F_{1,677} = 0.1, P = 0.75^1$
Viral load (concentration)	679	3.3 3.4 3.6	3.4 3.6 3.8	3.3 3.5 3.6	$F_{1,285} = 2.8, P = 0.11^1$
Body Mass Index	673	19 20 22	19 20 22	19 20 22	$F_{1,671} = 0.16, P = 0.69^1$

Uygur and Han patients had comparable HRQL on all four domains, including the COG dimension (Uygur: 30.0 ± 10.3 vs. Han: 29.0 ± 10.1;  $F(1,642) = 0.89, p = 0.346$ ). The same applies at the level of factor scores (PHS:  $p = 0.594$ ; REL:  $p = 0.620$ ; COG:  $p = 0.656$ ; TRT:  $p = 0.991$ ).

The MIMIC diagram (standardized parameters for factor paths) is depicted in **Figure 2**. There was a clear effect of injecting drug use on all HRQL dimensions ( $p < 0.001$ ).

## CONCLUSIONS.

The PROQOL-HIV questionnaire is a valid and reliable tool to assess HRQL in HIV-positive Chinese patients. Measurement invariance was demonstrated across Uygur and Han patients, which means that valid statistical comparisons of HRQL scores can be done using the four-dimension scoring scheme proposed for PROQOL-HIV.

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