Health-Related Quality of Life and Its Determinants Among Individuals with Spinal Cord Injury in China: Exploratory Analyses from Two National Surveys

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Objective: Spinal cord injury (SCI) is devastating[1] and affecting approximately 3.74 million Chinese[2]. This study seeks to evaluate the health-related quality of life (HRQoL) and its determinants among individuals with SCI in China, using real-world data from two nation-wide surveys to support future policy design.

Methods:

Study design and data source

- Two cross-sectional surveys were conducted across China in 2020 (n=2,983) and 2023 (n=3,027)
- Community-dwelling individuals with SCI were invited to complete the online questionnaire.
- Data collected: sociademographics, SCI characteristics and impacts, bladder management approaches, complications, healthcare utilization and expenses, and HRQoL
- HRQoL assessed using the Short Form-36 questionnaire and reported through the Physical Health Composite (PHC) and Mental Health Composite (MHC) scores.

Variables selection

- A two-pronged approach was adopted.
- The first involved a pragmatic literature search to identify factors influencing HRQoL[3],[4].
- The second approach was based on the availability of data reported in both surveys .

Table 1: Variables collected in the survey

Sociodemographics	• Gender[%] • Age, years[¤] • Family annual gross income[#]	• Marital status[#] • Education level[#] • Employment status[%]
SCI characteristics and impacts	• Cause of injury[#] • Remaining motor function[#] • Site of injury along the spinal cord[#] • Remnant hand dexterity[#]	• Time since SCI[¤] • Require wheelchair[%] • Require caregiver[%] • Ability to perform self-transfer[#]
Bladder management approaches	• Bladder emptying methods[#] • Reduced fluid intake[%]	• Daily urine volume[#]
Complications	• Episodes of UTI in the past 12 months[#] • Prophylactic antibiotic use[%] • Ever experienced sepsis[%], renal dysfunction[%], hydronephrosis[%], vesicoureteral reflux[%], bladder stones[%], kidney stones[%], urethral stricture[%], pain during catheterisation[%], bleeding during catheterisation[%]	
Healthcare utilization and expenses in the past 12 months	• No. of outpatient visits due to UTI[¤], SCI[¤] • No. of hospitalization due to UTI[¤], SCI[¤] • Having the different health Insurances[%] • Monthly out-of-pocket expenses on SCI related treatment[¤], rehabilitation after SCI[¤], bladder emptying[¤]	

Notes: [%]:Binary variable, [#]Categorical variable, [¤]continuous variable
Abbreviations: SCI UTI: Urinary tract infection(s)

Statistics methodology

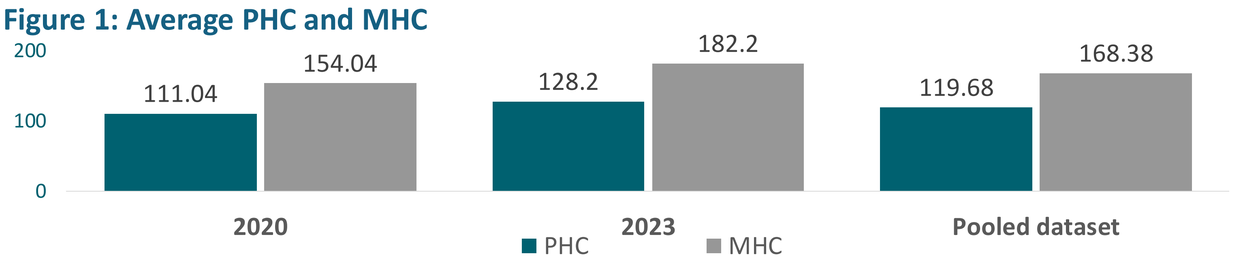
- Dataset： 2020, 2023, pooled-data
- Analysis: descriptive statistics, univariate regression and multilinear regression (iterative stepwise ordinary least squares)
- Robustness checks: generalized linear model and quantile regression
- Analyses excluded observations with incomplete data

Results:

Table 2: Sociodemographics

	2020	2023	Pooled dataset
Gender, Male (Count, %)	2108 (70.67%)	2082 (68.78%)	4190 (69.72%)
Age (Mean, SD)	44.92 (12.82)	45.84 (11.46)	45.38 (12.16)
Employment status, unemployed (Count, %)	1058 (35.46%)	1042 (34.42%)	2100 (34.94%)
Marital status, married (Count, %)	1565 (52.46%)	1623 (53.62%)	3188 (53.04%)
Education level, below high school (Count, %)	1676 (56.18%)	1898 (62.70%)	3574 (59.46%)
Family annual gross income, < 50k CNY (Count, %)	2434 (81.60%)	2618 (86.49%)	5052 (84.06%)

Figure 1: Average PHC and MHC



Regression analyses

Variables that were identified to be statistically significant determinants of PHC and MHC across datasets are summarized under Table 3.

Table 3: Determinants of PHC & MHC across the dataset

	PHC			MHC		
	2020	2023	Pooled data	2020	2023	Pooled data
Basic demographics						
Age		✓				
Marital status	✓		✓			✓
Education level	✓					✓
Employment status		✓	✓			
Family gross income (annual)		✓	✓	✓	✓	✓
Injuries and impact						
Cause of injury			✓			
Site of injury along the spinal cord						✓
Remaining motor function			✓			
Remnant hand dexterity			✓			✓
Time since SCI				✓	✓	✓
Ability to perform self-transfer	✓	✓	✓	✓	✓	✓
Requiring care giver	✓	✓	✓	✓		✓
Bladder management approaches						
Bladder emptying techniques	✓	✓	✓	✓	✓	✓
Reduced fluid intake	✓	✓	✓	✓	✓	✓
Complications and treatment						
Prophylactic antibiotic use	✓		✓	✓		✓
Experienced pain during catheterization	✓	✓		✓	✓	✓
UTI frequency in the past 12 months	✓	✓	✓		✓	✓
Ever experienced Renal stones	✓		✓			
Ever experienced Urinary stricture		✓	✓			
Ever experienced Renal dysfunction	✓		✓	✓		✓
Healthcare utilization and expenses in the past 12 months						
Mthly OOP expenses on bladder empyting	✓	✓	✓			✓
Mthly OOP expenses on SCI treatment	✓			✓		
No. of outpatient visits due to SCI			✓			
No. of hospitalization due to SCI		✓			✓	✓
No. of hospitalization due to UTI	✓		✓			
Having urban employee basic medical insurance						✓
Having workplace insurance			✓			✓
Having private insurance	✓	✓	✓	✓		✓
Observations	2,082	2,862	4,513	2,567	2,850	5,076
Adjusted-R^2	0.435	0.315	0.349	0.269	0.195	0.243

Key determinants of PHC and/or MHC

Variables that were consistently identified as determinants of PHC and/or MHC across regression analyses are summarized under Table 4. Notably, two out of the three variables identified were related to bladder management (bladder emptying technique and reduced fluid consumption) hence suggesting its importance to HRQoL.

Table 4: Determinants of PHC & MHC

	Positively associated	Negatively associated
PHC & MHC	• Ability to perform self-transfer	• Reduced fluid intake • All non-normal voiding bladder emptying techniques
PHC	• Having private health insurance	• Need for caregiver • Increased frequency of UTI • Increased OOP expense on bladder emptying
MHC	• Time since SCI • Higher gross family income	• Pain during catheterisation

Limitations: The two surveys were conducted independently and anonymously, without unique indentifiers to link patient records across years. Therefore, longitudinal comparisons are limited. The cross-sectional inference, and the identified associations should be interpreted as correlations only. Retrospective patient-reported outcomes may be influenced by recall bias and limited understanding of medical conditions. Although robustness of regression results was examined, the presence of missing data may still affect the precision of estimates.

Conclusion: These identified variables could influence HRQoL among people with SCI in China and warrant further attention during long-term follow-up to better support them in living a meaningful life post SCI.

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