

Patients with chronic hepatitis B infection: what is their quality of life?

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ABSTRACT

Introduction: Hepatitis B (HBV) is endemic in Singapore. This study aimed to determine the quality of life of patients with chronic HBV infection (HBV carriers) on conservative management. They were reviewed in primary care facilities and in a district hospital in Singapore.

Methods: This cross-sectional survey utilised a validated Hepatitis Quality of Life questionnaire, which incorporated the SF-36 health survey, to assess a convenience sample of HBV carriers' quality of life in 14 domains. The mean scores in each domain were determined, with higher scores indicating better health. Wilcoxon-Mann-Whitney test was used in the data analysis to determine statistical significance (p-value is less than 0.05).

Results: The mean age of 108 participants was 44.1 (standard deviation 12.5) years. They were predominantly Chinese (90.7 percent), male (58.3 percent) and 50.7 percent of them had family members who were HBV-infected. The latter had higher scores in the hepatitis specific limitation (HLIM) domain. The majority did not have any impaired physical nor mental health. In comparison with the healthy peers in the local population, the Chinese HBV carriers scored significantly lower in the "social functioning" domain (p-value is less than 0.001), regardless of gender.

Conclusion: The majority of HBV carriers had good physical and mental health. Physicians should recognise the impact of the chronic infection on the social aspects of daily living of the HBV carriers, and such issues should be addressed appropriately to provide better quality care.

Keywords: chronic hepatitis B infection, hepatitis B carrier, quality of life

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INTRODUCTION

4%–5% of the population in Singapore is afflicted with chronic hepatitis B (HBV) infection.⁽¹⁾ They are referred to as HBV carriers in this article. Due to the local fee

for the service healthcare system, the HBV carriers are followed-up either in primary care facilities, including general practitioner clinics and polyclinics, or in tertiary institutions, such as the specialist clinics in hospitals. Considering that definitive anti-HBV drug therapy is targeted at selected groups of HBV carriers with active viral replication and may be associated with significant morbidity, physicians' role appeared to focus on disease surveillance with radiological and biomedical investigations for these perceived asymptomatic patients.⁽²⁾ In contrast, HBV carriers often do not recognise the need for such monitoring and perceive a lack of active interventions in their medical treatment.^(2,3)

Thus, the HBV carriers' functional status and perceptions of health could differ from the physicians' assessment of patients' health status. The quality of life (QOL) could easily be overlooked due to barriers existing in the current healthcare system,⁽³⁾ but carriers' perceived health could be the forefront of their concern. Their concerns and perceptions of health should be addressed and recognised as an important clinical outcome in their management. In addition, there are reports of decreased QOL and depression associated with the closely related chronic hepatitis C (HCV) infection,^(4,5) paediatric HBV carriers⁽⁶⁾ and Korean immigrants⁽⁷⁾ with HBV and related liver diseases.

Quantitative measures of the values subjects place on their state of health are used to determine their QOL. Such efforts have led to the development of various health-related quality of life (HRQOL) scales,⁽⁸⁾ which assess various domains of perceived health such as physical and social functioning. The reliability, validity and clinical utility of such scales have been proven and used in clinical research. These scales assist the healthcare professionals to assess the impact of various diseases on their patients' QOL. As healthcare workers strive towards providing holistic care to these patients, such assessment could become an integral component of their management.

The Short Form 36 Health Survey (SF-36) is a validated and globally used measure of QOL, which has been used to measure HRQOL in over 130 diseases.⁽⁹⁾ It has also been shown to be a valid measure of HRQOL in Singapore in a large survey, which established the normal scores for the main races in local population.⁽¹⁰⁾ This study assessed the QOL of HBV carriers under surveillance

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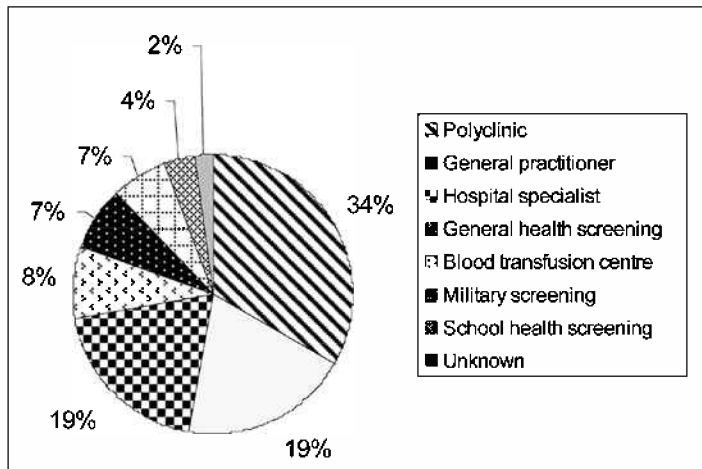


Fig. 1 Pie chart shows sites where the HBV carriers were first diagnosed of the HBV infection.

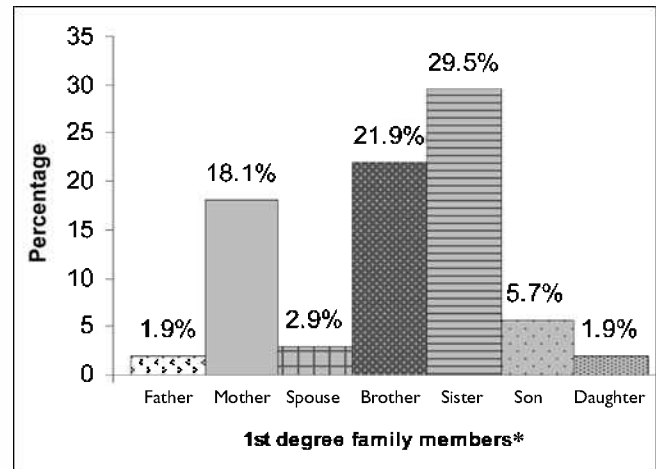


Fig. 2 Bar chart shows family members of HBV carriers who were similarly infected.

*There could be more than one family member who was HBV-infected.

in primary care clinics and a hepatitis clinic in a district hospital in Singapore using the validated Hepatitis Quality of Life Questionnaire (HQLQ) scale.⁽¹¹⁾

METHODS

The HQLQ was developed by Bayliss et al originally as a combined generic and disease-specific instrument for the assessment of QOL for chronic HCV.⁽¹¹⁾ The authors selected HQLQ as it included an augmented core SF-36 scale, where comparison with local normal scores⁽¹⁰⁾ can be executed. Reliability test of HQLQ showed internal consistency (α 0.81–0.94).⁽¹²⁾ It is viral hepatitis specific, as there were many similarities between the natural history of HBV and HCV. Foster et al had used the SF-36 to assess the QOL of patients with both HBV and HCV in London.⁽⁴⁾

The HQLQ assesses HBV carriers' QOL in 14 domains:

1. SF-36 Physical Functioning (PF)
2. SF-36 Role Physical (RP)
3. SF-36 Bodily Pain (BP)
4. SF-36 General Health (GH)
5. SF-36 Vitality (VT)
6. SF-36 Social Functioning (SF)
7. SF-36 Role Emotional (RE)
8. SF-36 Mental Health Index (MH)
9. SF-36 Physical Component Scale (PCS)
10. SF-36 Mental Component Scale (MCS)
11. HQLQ Health Distress (HD)
12. HQLQ Positive Well-being (PWB)
13. HQLQ Hepatitis-specific limitation (HLM)
14. HQLQ Hepatitis health distress (HHD)

The scores were calculated using the standardised scoring formula, which range from 0 to 100, with higher scores

reflecting better health.

The HBV carriers were identified via the SingHealth–Clinical Trial and Epidemiology Unit HBV carriers' database and specialist clinic records of Changi General Hospital, a district hospital located in eastern Singapore. They satisfied the following inclusion and exclusion criteria: the participants were confirmed HBV carriers, aged ≥ 12 years, and with two consecutive positive HBV surface antigen tests. If serological evidence was not found in the record, they were identified from referral letters from physicians who had previously managed them as HBV carriers. Participants with concurrent chronic viral or bacterial infection, such as human immunodeficiency virus (HIV) or pulmonary tuberculosis (PTB), or pre-existing known HBV-related complications such as cirrhosis, hepatocarcinoma or liver failure, were excluded.

The participants were not currently on any anti-viral therapy. Concomitant chronic diseases from other aetiology, such as hypertension, diabetes mellitus, etc, did not constitute exclusion criteria. HBV predominantly affects patients of Chinese ethnic origin,⁽¹⁾ which comprise the majority of the Asian population in Singapore. Data was entered into an MS Excel spreadsheet. Individual HQLQ items were re-coded, summed and transformed according to standardised formula. Mean score and standard deviation (SD) were determined. Comparisons were carried out between the subgroups with study population and those with normal values of the local Chinese population. Wilcoxon-Mann-Whitney test was used as the scores were skewed and a p-value of 0.05 was considered as statistically significant. All analyses were performed with SAS software. Both the SingHealth Polyclinics and Changi General Hospital institution review boards approved the study.

Table I. Mean score of the domains in HQLQ for all HBV carriers in the study population.

Domains in HQLQ	Mean	SD	Min.	Max.
SF-36 Physical functioning (PF)	85.1	21.9	0.00	100.0
SF-36 Role physical (RP)	90.7	19.4	20.0	100.0
SF-36 Pain index (BP)	80.6	22.3	21.0	100.0
SF-36 General health perception (GH)	67.0	20.4	25.0	100.0
SF-36 Vitality (VT)	60.1	18.3	6.7	100.0
SF-36 Social functioning (SF)	67.1	12.8	25.0	93.8
SF-36 Role emotional (RE)	89.6	23.7	25.0	100.0
SF-36 Mental health index (MH)	75.2	15.2	24.0	100.0
Standardised physical component scale (PCS)	50.7	7.0	31.2	61.9
Standardised mental component scale (MCS)	48.5	7.3	20.0	60.8
HQLQ health distress (HD)	80.7	19.6	0.0	100.0
HQLQ positive well-being (PWB)	66.9	20.2	10.0	100.0
HQLQ hepatitis specific limitation (HLIM)	88.5	22.4	0.0	100.0
HQLQ hepatitis health distress (HHD)	80.9	21.0	0.0	100.0

Table II. Gender and age of hepatitis B carriers in association with their quality of life.

Domain*	Gender				p-value	Age (years)				p-value
	Male (n = 63)		Female (n = 45)			< 40 (n = 40)		≥ 40 (n = 68)		
	Mean	SD	Mean	SD		Mean	SD	Mean	SD	
PF	88.2	18.6	88.2	18.6	0.163	91.9	19.6	81.2	22.4	0.001*
RP	91.4	17.5	89.8	22.0	0.194	97.5	9.3	86.8	22.6	0.002*
BP	84.9	19.6	74.6	24.7	0.030*	83.1	22.5	79.2	22.2	0.292
GH	67.3	20.5	66.7	20.3	0.858	71.9	18.1	64.2	21.2	0.061
VT	62.0	17.7	57.4	19.0	0.275	60.5	17.2	59.9	19.0	0.992
SF	68.1	12.4	65.7	13.5	0.585	68.4	11.5	66.3	13.6	0.514
RE	89.7	23.3	89.4	24.7	0.927	95.6	14.9	86.0	27.1	0.065
MH	77.3	13.7	72.2	16.7	0.144	75.9	13.9	74.7	16.0	0.924
PCS	51.7	6.6	49.3	7.2	0.069	53.1	6.1	49.2	7.1	0.002*
MCS	49.0	7.2	47.9	7.6	0.605	48.7	6.6	48.4	7.8	0.763
HD	77.4	20.3	85.3	17.8	0.013*	83.0	15.7	79.3	21.6	0.585
PWB	67.5	18.3	66.0	22.8	0.918	70.1	18.1	64.9	21.2	0.287
HLIM	88.4	21.2	88.7	24.2	0.464	94.5	14.1	85.0	25.5	0.078
HHD	78.8	22.5	83.9	18.7	0.195	84.0	17.2	79.1	22.9	0.420

* Refer to Table I for the full terms.

RESULTS

The investigators approached 180 HBV carriers (90 hospital and 90 polyclinic patients) who satisfied the inclusion and exclusion criteria on a case-encounter basis. 108 (68 polyclinic and 40 hospital subjects) of them consented to the study, constituting a response rate of 60%. The mean age was 44.1 (SD 12.5) years. The race was predominantly Chinese (90.7%), followed by Malay (5.6%), Indian (2.8%) and others (0.9%). The primary site of diagnosis was in primary care, while others were diagnosed by hospital specialists or at a general health screening, blood transfusion centre or screening during military service (Fig. 1). 50.7% of them had at least one family member who was HBV infected (Fig. 2), while 15.7% had a family history of hepatocellular carcinoma.

The mean scores of the 14 domains in the HQLQ questionnaire are shown in Table I. Based on statistical

analysis, the HBV carriers were similar in many aspects of their QOL, apart from the following demographic differences, as shown in Tables II to V:

- (1) Male HBV carriers had a higher BP score compared to female carriers (Table II).
- (2) Female carriers had a higher HD score compared with males carriers (Table II).
- (3) Younger carriers (< 40 years of age) had higher PF, RP and PCS scores than older carriers (≥ 40 years of age) (Table II).
- (4) HBV carriers with employment had higher scores in PF and GH than those who were unemployed (Table III).
- (5) HBV carriers with a family history of chronic HBV infection had higher scores in HLIM compared to those without such family history (Table IV).
- (6) HBV carriers with a family history of hepato-

Table III. Sites of review and employment status of hepatitis B carriers in association with their quality of life.

Domain*	Sites of review				p-value	Employment status				p-value
	Polyclinic (n = 68)		Hospital (n = 40)			Employed (n = 79)		Unemployed (n = 27)		
	Mean	SD	Mean	SD		Mean	SD	Mean	SD	
PF	86.5	17.8	82.8	27.7	0.670	88.4	17.7	75.6	30.1	0.019*
RP	93.2	15.3	93.2	15.3	0.200	92.4	17.3	88.2	21.0	0.327
BP	79.6	21.6	82.3	23.7	0.400	79.9	22.9	79.9	22.9	0.681
GH	68.4	19.6	64.7	21.7	0.424	69.8	18.9	59.0	21.4	0.022*
VT	64.7	21.7	64.7	21.7	0.692	59.8	18.2	59.8	18.2	0.945
SF	67.8	12.1	67.8	12.1	0.579	67.6	12.6	64.8	13.4	0.539
RE	67.8	12.1	85.6	27.7	0.174	91.5	22.3	85.2	27.1	0.088
MH	75.2	15.7	75.1	14.4	0.800	75.8	15.3	73.0	14.9	0.264
PCS	51.1	5.9	50.0	8.5	0.935	51.5	6.4	48.4	7.9	0.097
MCS	48.8	6.8	48.8	6.8	0.743	48.6	7.7	48.1	6.4	0.473
HD	82.4	19.8	77.9	19.1	0.142	81.3	18.9	78.3	22.2	0.682
PWB	77.9	19.1	64.5	19.2	0.306	68.4	19.9	61.5	20.4	0.124
HLIM	87.8	22.2	89.8	22.9	0.151	89.6	20.6	84.4	27.5	0.741
HHD	81.0	21.5	80.9	20.5	0.887	80.6	20.3	80.4	23.5	0.617

* Refer to Table I for the full terms.

Table IV. Hepatitis B carriers' family history of HBV infection and liver cancer in association with their quality of life.

Domain*	Family history of chronic HBV infection				p-value	Family history of liver cancer				p-value
	Yes (n = 55)		No (n = 53)			Yes (n = 17)		No (n = 91)		
	Mean	SD	Mean	SD		Mean	SD	Mean	SD	
PF	89.1	16.1	81.0	26.3	0.080	84.4	17.3	85.3	22.8	0.470
RP	91.3	18.4	90.2	20.6	0.905	85.9	27.2	91.7	17.7	0.510
BP	80.4	23.8	80.8	20.8	0.833	73.3	25.9	82.0	21.4	0.210
GH	69.0	21.2	65.0	19.4	0.237	67.7	22.7	66.9	20.0	0.809
VT	61.5	17.2	58.7	19.4	0.434	62.3	18.6	59.7	18.3	0.654
SF	66.5	13.1	67.7	12.7	0.535	65.4	12.1	67.4	13.0	0.416
RE	89.6	24.9	89.6	22.7	0.676	83.8	30.5	90.7	22.3	0.470
MH	75.7	14.6	74.6	15.9	0.720	76.2	17.8	76.2	17.8	0.602
PCS	51.6	6.7	49.7	7.1	0.076	49.4	7.0	50.9	7.0	0.311
MCS	48.3	7.6	48.7	7.1	0.787	48.6	9.3	48.5	7.0	0.761
HD	82.5	17.8	78.9	21.3	0.429	83.2	16.5	80.2	20.2	0.733
PWB	70.6	19.6	63.0	20.3	0.066	77.1	17.6	65.0	20.2	0.025*
HLIM	93.2	15.7	83.7	26.9	0.044*	92.6	17.1	87.8	23.2	0.363
HHD	83.1	19.8	78.7	22.2	0.337	83.8	19.2	80.4	21.4	0.590

* Refer to Table I for the full terms.

carcinoma had a higher PWB score than carriers without such family history (Table IV).

There was no difference in QOL score for HBV carriers who were reviewed and followed-up in polyclinics or in the hospital. In comparison with the healthy local Chinese population, the Chinese participants, who constitute the majority of HBV carriers in Singapore, had a lower score in SF, regardless of gender. In contrast, they had higher scores in PF and RP compared with the local Chinese population. They had lower scores in VT and higher RE scores, but these scores did not reach statistical significance ($p = 0.05$).

DISCUSSION

This was a selected pool of HBV carriers being followed-

up in the polyclinics and a specialist clinic in a hospital. Polyclinics are primary healthcare centres, funded by the local health authority to provide subsidised care to outpatients, and are thus often crowded. However, 19% of patients' HBV infections were previously diagnosed by private general practitioners. The fees-for-service, walk-in system enables patients to select the sites of follow-up. The disparity of the cost of investigations is a prime factor in driving patients' follow-up from private general practitioners to the polyclinics.⁽²⁾ The high workload in the polyclinics may hamper in-depth discussion of psychosocial issues for these patients.⁽²⁾ Thus, this doctor-hopping with disrupted continuity of care may indirectly be a hindrance towards dealing with QOL issues in the community.⁽²⁾

Table V. Chinese hepatitis B carriers' HQLQ scores compared with the norm for healthy Chinese individuals in Singapore.

	Norm for Chinese in Singapore ⁽¹⁰⁾		Chinese HBV carriers in study		p-value	Norm for Chinese males in Singapore ⁽¹⁰⁾		Chinese male HBV carriers in study		p-value	Norm for Chinese females in Singapore ⁽¹⁰⁾		Chinese female HBV carriers in study		p-value
	Mean	SD	Mean	SD		Mean	SD	Mean	SD		Mean	SD	Mean	SD	
No.	98					57					41				
PF	83.30	22.10	85.82	21.04	0.24	83.20	22.17	89.56	15.76	0.04*	83.56	21.92	80.61	26.03	0.47
RP	86.70	27.40	90.82	19.72	0.04*	85.88	28.33	91.93	17.26	0.01*	87.76	26.24	89.27	22.85	0.68
BP	82.30	19.60	82.07	21.96	0.92	82.11	19.77	85.84	19.64	0.16	82.57	19.49	76.83	24.10	0.14
GH	69.30	17.40	67.28	20.50	0.33	68.81	18.23	67.11	20.81	0.54	69.89	16.31	67.53	20.31	0.46
VT	63.80	16.40	60.15	18.50	0.05**	63.76	17.53	61.93	17.56	0.44	64.36	15.98	57.68	19.69	0.03*
SF	83.90	18.60	66.65	13.00	<0.001*	83.74	18.07	67.21	12.40	<0.001*	84.34	18.26	65.85	13.91	<0.001*
RE	84.20	30.50	89.03	24.37	0.05**	81.95	30.84	89.47	23.60	0.02*	84.07	31.12	88.41	25.68	0.29
MH	72.90	16.00	74.74	14.56	0.22	73.29	18.48	76.42	12.51	0.06	73.33	15.25	72.39	16.90	0.72

*p < 0.05

**p = 0.05

In contrast to a study by Foster et al, who showed that HBV carriers had a lower mental health index compared with controls,⁽⁴⁾ it did not appear to be so for this study population. This could be affected by the stage of the disease progression, which was not determined in this survey, and the cultural and social context of the two study populations. The biological constitution of the HBV carriers, including gender and age, could have accounted for the results in (1) to (3). The younger HBV carriers are expected to have greater physical capacity compared to the more senior carriers, even for healthy subjects. This could also account for HBV carriers who were employed to achieve higher scores in PF and GH.

At least half of the study population had HBV-infected family members, especially their mothers. Vertical transmission is the prevalent mode of transmission in Singapore.⁽¹⁾ HBV carriers with a family history of similar infection seemed to be less restrained in daily activities by the disease (higher HLIM score). Increased awareness of the disease due to familiarity from other affected family members and mutual support could be contributing factors. Similarly, those with a family history of HBV-related liver malignancy had a higher score in PWB. A local qualitative study by the same authors showed that awareness of the disease motivated the majority of HBV carriers to embark on healthier lifestyles and thus improved physical wellbeing.⁽¹³⁾

Local HBV carriers were familiar with the common liver-related complications, such as cirrhosis and malignancy.⁽³⁾ Based on the Health Belief model,⁽¹⁴⁾ the perceived threat of a potentially life-threatening condition, such as malignancy from the chronic infection, is a strong motivating factor in health-seeking behaviour. This is possible only

if the HBV carriers are aware of the natural history of their chronic disease. Thus, HBV-related health education is an important responsibility of their attending physicians,⁽¹⁵⁾ who could use the perceived threat to promote healthier lifestyles. The same study also showed that the majority did not perceive any ill physical health.⁽¹³⁾ The Chinese HBV carriers had also been shown in this study to have a higher score in RP compared with the general Chinese population.

The Chinese HBV carriers had a significantly lower score in SF compared with their healthy peers in the general population. Disease stigmata are a prime social hindrance for the local HBV carriers,⁽²⁾ which interfered with their social interaction. There is a need for greater public awareness of the mode of transmission of the infection. Many carriers rely on their physicians for HBV-related information.⁽³⁾ Thus, healthcare professionals should lead in such health educational programmes and inculcate strategies for these carriers to cope with their social activities. HBV support group is another option for these carriers to share their experiences in dealing with this stigma and to integrate themselves seamlessly in social events without any embarrassment. The nature of the disease necessitates that HBV carriers embark on long-term follow-up by their physicians. The results will highlight to the physicians the need to address the impact of the virus on the social lives of these HBV carriers.

Limitations of this study are listed. The participants were English-speaking subjects due to the language used in the questionnaire. The response rate from the hospital subjects was suboptimal, thus caution should be exercised in extrapolating the results to all HBV carriers in Singapore. In addition, this study did not correlate the QOL with the histological classification of the disease as none of these carriers had any

liver biopsy. In view of the sample size, further age stratification was not carried out for the comparison between the HBV carriers and the normal Chinese population.

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