

# Questionnaire survey on knowledge, attitudes, and behaviour towards viral hepatitis among the Hong Kong public

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## ABSTRACT

**Introduction:** We aimed to identify gaps in knowledge, attitudes, and behaviours towards viral hepatitis among the Hong Kong public and provide insights to optimise local efforts towards achieving the World Health Organization's viral hepatitis elimination target.

**Methods:** A descriptive, cross-sectional, self-reported web-based questionnaire was administered to 500 individuals (aged  $\geq 18$  years) in Hong Kong. Questionnaire items explored the awareness and perceptions of viral hepatitis-related liver disease(s) and associated risk factors in English or traditional Chinese.

**Results:** The majority (>80%) were aware that chronic hepatitis B and/or C could increase the risks of developing liver cirrhosis, cancer, and/or failure. Only 55.8% had attended health screenings in the past 2 years, and 67.6% were unaware of their family's history of liver diseases. Misperceptions surrounding the knowledge and transmission risks of viral hepatitis strongly hint at the presence of social stigmatisation within the community. Many misperceived viral hepatitis as airborne or hereditary, and social behaviours (casual contact or dining with an infected person) as a transmission route. Furthermore, 62.4% were aware of hepatitis B vaccination, whereas 19.0% knew that hepatitis C cannot be prevented by vaccination. About 70% of respondents who were aware of mother-to-child transmission were willing to seek medical consultation in the event of pregnancy. Gaps in

knowledge as well as the likelihood of seeking screening were observed across all age-groups and education levels.

**Conclusions:** Comprehensive hepatitis education strategies should be developed to address gaps in knowledge among the Hong Kong public towards viral hepatitis, especially misperceptions relevant to social stigmatisation and the importance of preventive measures, including vaccination and screening, when exposed to risk factors.

Hong Kong Med J 2021;27:Epub

<https://doi.org/10.12809/hkmj219463>

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This article was published on 23 Jul 2021 at [www.hkmj.org](http://www.hkmj.org).

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### New knowledge added by this study

- General awareness of potential risks of viral hepatitis developing into liver cirrhosis, cancer, or liver failure.
- Many still had misperceptions in terms of knowledge and transmission risk of viral hepatitis, suggestive of social stigma or discrimination towards infected individuals.
- Gaps in knowledge about viral hepatitis and likeliness to seek medical screening were observed across all age-groups, especially in respondents with secondary or higher education.

### Implications for clinical practice or policy

- We emphasise the importance of preventive measures including screening, diagnosis, treatment, and care to effectively manage viral hepatitis in Hong Kong.
- It is essential to develop universal education strategies to address misperceptions relevant to social stigmatisation, aligning with the community's preferences for various information media channels to optimise information reception.

## 香港市民對病毒性肝炎的知識、態度及行為的問卷調查

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引言：我們旨在檢視香港公眾對病毒性肝炎知識、態度和行為的落差，並提供優化本地工作的見解，實現世界衛生組織的消除病毒性肝炎目標。

方法：對香港500名市民（年齡18歲或以上）進行描述性橫斷面自我報告的網絡問卷調查。問卷提供英語及繁體中文版本，項目包括對病毒性肝炎相關肝病及相關危險因素的認識和看法。

結果：大部份受訪者（超過80%）意識到慢性乙型和 / 或丙型肝炎會增加肝硬化、癌症和 / 或衰竭的風險。僅55.8%在過去2年進行健康檢查，67.6%不知道其家族有肝病史。圍繞病毒性肝炎的知識和傳播風險的誤解強烈暗示社區內存在社會污名化。許多人將病毒性肝炎誤解為空氣傳播或遺傳性肝炎，並將社交行為（例如與感染者隨意接觸或用餐）視為傳播途徑。此外，62.4受訪者認識乙肝疫苗接種，而19.0%知道丙肝疫苗不能通過疫苗接種來預防。約70%知道母嬰傳播的受訪者願意在懷孕時就醫。在所有年齡組別和不同教育水平的受訪者中都觀察到其對病毒性肝炎的知識及篩查意願的落差。

結論：應制定全面的肝炎教育策略，以解決香港公眾對病毒性肝炎的知識差距，尤其與社會污名化相關的誤解，以及暴露於風險因素時的預防措施，包括疫苗接種和篩查的重要性。

### Introduction

Viral hepatitis is a major public health burden worldwide and is the predominant aetiology of liver cirrhosis and/or liver cancer.<sup>1,2</sup> At least 325 million individuals were reported to be infected with viral hepatitis B (HBV) and/or C (HCV).<sup>2,3</sup> Hong Kong is considered an endemic area with intermediate incidence of HBV infection.<sup>4</sup> In a local epidemiological study conducted between 2015 and 2016, the seroprevalence of hepatitis B surface antigen (HBsAg) was estimated at 7.8% among the general population.<sup>5</sup> In contrast, the prevalence rate of HCV infection in Hong Kong has remained low.<sup>6</sup> The seroprevalence of anti-HCV positivity among new blood donors was 0.06% in 2017, compared with 0.11% in 2008.<sup>6</sup> The local HCV prevalence among the general population between 2015 and 2016 was estimated at 0.5%,<sup>5</sup> which has remained relatively unchanged since 1992.<sup>7</sup>

In 2016, the World Health Organization (WHO) implemented a global elimination strategy targeted to achieve at least a 90% diagnosis rate of all viral hepatitis cases, an 80% treatment rate for all diagnosed cases, and a 90% reduction in the incidence of viral hepatitis cases.<sup>3</sup> Recent epidemiological studies in Hong Kong revealed that the diagnosis and treatment uptake rates within the community were significantly lacking, hovering around 50% compared with the WHO's 90%/80%

targets.<sup>5,8</sup> It has been suggested that inadequate knowledge and awareness about viral hepatitis B and C within Hong Kong's community might be driving this deficiency.<sup>5,8-10</sup> In other parts of the world, social stigma arising from poor knowledge has been reported to reduce diagnosis and treatment rates among high-risk individuals.<sup>11-13</sup>

In 2020, the Hong Kong Viral Hepatitis Action Plan (HKVHAP) 2020-2024 was launched to facilitate achieving the WHO's eradication target goals by 2030. The action plan outlined four major strategies: (1) Awareness, (2) Surveillance, (3) Prevention, and (4) Treatment to monitor and implement local efforts towards achieving the WHO's 2030 elimination target.<sup>14</sup>

In the present study, we aimed to explore the knowledge, attitudes, and behaviour within Hong Kong's general population pertaining to viral hepatitis and related risk factors. Furthermore, in this study, we sought to identify potential gaps in existing knowledge, attitudes, and behaviour related to the WHO's global viral hepatitis elimination strategy to optimise local efforts towards the WHO's target goal.

### Methods

#### Study population

Potential respondents were recruited through an existing, general purpose (ie, not healthcare-specific) web-based consumer panel via email in February 2020. Respondents who were aged  $\geq 18$  years, had access to online or computer with web-based administration, and were able to read English or traditional Chinese were eligible to participate in the study. There were no exclusion criteria for this study. All eligible respondents explicitly agreed to join the panel and provided informed online consent to participate in the study.

Assuming 95% confidence intervals and 50% response distribution, responses collected from 500 adult individuals were deemed sufficient to provide descriptive estimates with 4.33% margin of error.

#### Study design

Items pertaining to awareness and perceptions of liver diseases among the general public were explored using a self-administered web-based survey. The survey questionnaire was developed in English and translated into traditional Chinese. The translation was validated by a linguist from a translation company who is a native speaker of the language. The developed questionnaire was reviewed and finalised by a steering committee comprising gastroenterology and/or hepatology experts from 11 countries/territories as part of a regional liver index study (Lee Mei-hsuan et al, unpublished). All

respondents completed the questionnaire in either English or Chinese. Only de-identified data were collected.

### Survey questionnaire

The internal consistency of the questionnaire from the regional liver index study was assessed by Cronbach's alpha (threshold: alpha >0.7). As part of this study's objective to explore the knowledge, attitudes, and behaviour of Hong Kong's public towards viral hepatitis-related liver diseases, seven items were extracted from the questionnaire used in a regional liver index study. These items pertained to the awareness and knowledge of liver diseases as well as the respondents' attitudes and behaviours towards screening and diagnosis of liver diseases (online supplementary Appendix 1; Q1-7).

Seven screener questions (online supplementary Appendix 1; S1-7) pertaining to the respondents' socio-demographic characteristics, including age, sex, education, monthly household income, and their awareness of different types of hepatitis were also included in this study.

Respondents who indicated their awareness of 'hepatitis B' or 'hepatitis C' in screener item S7 proceeded to answer Q1(I)-Q2(I) or Q1(II)-Q2(II). Female respondents who correctly recognised the statement 'from a pregnant mother to her baby' in Q2f(I) or Q2f(II) proceeded to answer Q3c.

### Descriptive analysis

This study was exploratory and descriptive in nature. Respondents' characteristics and responses to the survey questions were summarised and are presented as frequencies and percentages. No statistical analyses were performed.

Missing data were random; all data were reported, including those of respondents who declined to answer certain screener questions, such as on monthly household income. Missing data for any question were excluded from analysis of that question only, not from the whole study.

## Results

### Study population characteristics

Among the respondents, 68.0% were aged ≥35 years, and 56.0% were female. Among the respondents, 59.0% had completed university or higher education, and 76.0% possessed private insurance. About 70% of respondents had a monthly household income of ≥HK\$30 000. The respondents' sex, age, education level, and household income were reflective of Hong Kong's population.<sup>15</sup> Approximately half of the respondents (55.8%) self-reported having attended health screenings within the last 2 years, and about 32.4% of them were aware of their family history pertaining to liver diseases (Table 1).

TABLE 1. Characteristics of study population (n=500)\*

	No. of respondents
Age-group, y	
<25	60 (12.0%)
25-34	100 (20.0%)
35-44	110 (22.0%)
45-54	110 (22.0%)
55-64	103 (20.6%)
≥65	17 (3.4%)
Sex	
Male	220 (44.0%)
Female	280 (56.0%)
Education level	
Primary school	5 (1.0%)
Secondary school	200 (40.0%)
University	244 (48.8%)
Postgraduate	51 (10.2%)
Household income, HKD	
<\$10 000	18 (3.6%)
\$10 000-\$16 999	34 (6.8%)
\$17 000-\$29 999	87 (17.4%)
\$30 000-\$49 999	165 (33.0%)
≥\$50 000	190 (38.0%)
Declined to answer	6 (1.2%)
Medical insurance†	
Private insurance–self-pay	380 (76.0%)
Private–corporate insurance	188 (37.6%)
Public insurance (eg, national or subsidised)	25 (5.0%)
None of the above	71 (14.2%)
Self-reported last health screening within 2 years	
Yes	279 (55.8%)
No	221 (44.2%)
Are you aware of your family history related to liver disease?	
Yes	162 (32.4%)
No	338 (67.6%)

\* Data are shown as No. (%)

† Each respondent could have more than one medical insurance attribute

### General knowledge and awareness of hepatitis B and C

A higher proportion of respondents were aware of hepatitis B (93.0%, 465/500) than hepatitis C (46.4%, 232/500) [online supplementary Appendix 2]. The majority (>80%) were aware that hepatitis B and C can cause liver failure and increase the risks of developing liver cirrhosis and liver cancer (Fig 1a).

About 60% of respondents who were aware of hepatitis B knew that HBV is not airborne (61.5%) and can be prevented by a vaccine (62.4%). Only approximately 40% (186/465) of the respondents were aware that hepatitis B is not hereditary (Fig 1a). In contrast, only 19.0% (n=44/232) of those aware of hepatitis C knew that it cannot be prevented by vaccination, and about half knew that it is neither airborne (54.3%) nor hereditary (41.8%) [Fig 1a].

About half of the respondents aged <25 years (58.2%) and 55 to 64 years (46.9%) were not aware that hepatitis B is preventable by vaccination. More than half of the respondents across all age-groups

were unaware that hepatitis B is not hereditary, with the highest proportion aged <25 years (80.0%). A substantial proportion of respondents (>35%) with either secondary or university education misperceived hepatitis B to be airborne (38.5%; 39.8%) or hereditary (62.0%; 59.7%) [online supplementary Appendix 3].

More than 70% of respondents across all age-groups and >80% with secondary school or university education misperceived that a vaccine could prevent hepatitis C. About half of subjects aged 25 to 44 years and ≥65 years were not aware that hepatitis C is not airborne, whereas >70% of those aged 25 to 34 years and ≥65 years misperceived hepatitis C to be hereditary. More than half of respondents with university (61.0%) or postgraduate (51.9%) education misperceived hepatitis C as hereditary (online supplementary Appendix 4).

### Knowledge about the transmission risks of hepatitis B and C

At least 30% of respondents rightly perceived that (1) touching an infected person (HBV: 29.9%; HCV: 31.5%), (2) the faecal-oral route (21.9%; 28.4%); or (3) dining with an infected person (42.2%; 38.4%) were not possible modes of transmission of viral hepatitis B and C (Fig 1b). More than half of the respondents were aware of the mother-to-child transmission risk of HBV (68.4%) and HCV (53.9%) [Fig 1b]. Awareness of other transmission modes of HBV and HCV are detailed in online supplementary Appendix 2.

More than 60% of respondents across all age-groups and those with at least secondary school education did not correctly identify the transmission risks of HBV (online supplementary Appendix 5): more than half with secondary or university education misperceived touching (73.3%; 70.4%) or dining with an infected person (60.4%; 56.2%) as HBV transmission risks.

With regard to hepatitis C, more than half of the respondents aged ≥35 years and at least 60% of individuals with at least secondary-level education were unaware or incorrectly identified with the statements regarding social interaction and food contamination as HCV transmission risks. Notably, no respondents with the primary school education level were aware of hepatitis C (online supplementary Appendix 6).

### Likelihood of attending health screening in the event of family planning

Among the 280 female respondents, 65% correctly identified mother-to-child transmission as a transmission risk of viral hepatitis B and/or C (Fig 2). Among these respondents, 70.3% expressed that they were extremely likely or likely to seek a doctor's consultation to get tested if they were or intended to become pregnant (Fig 2).

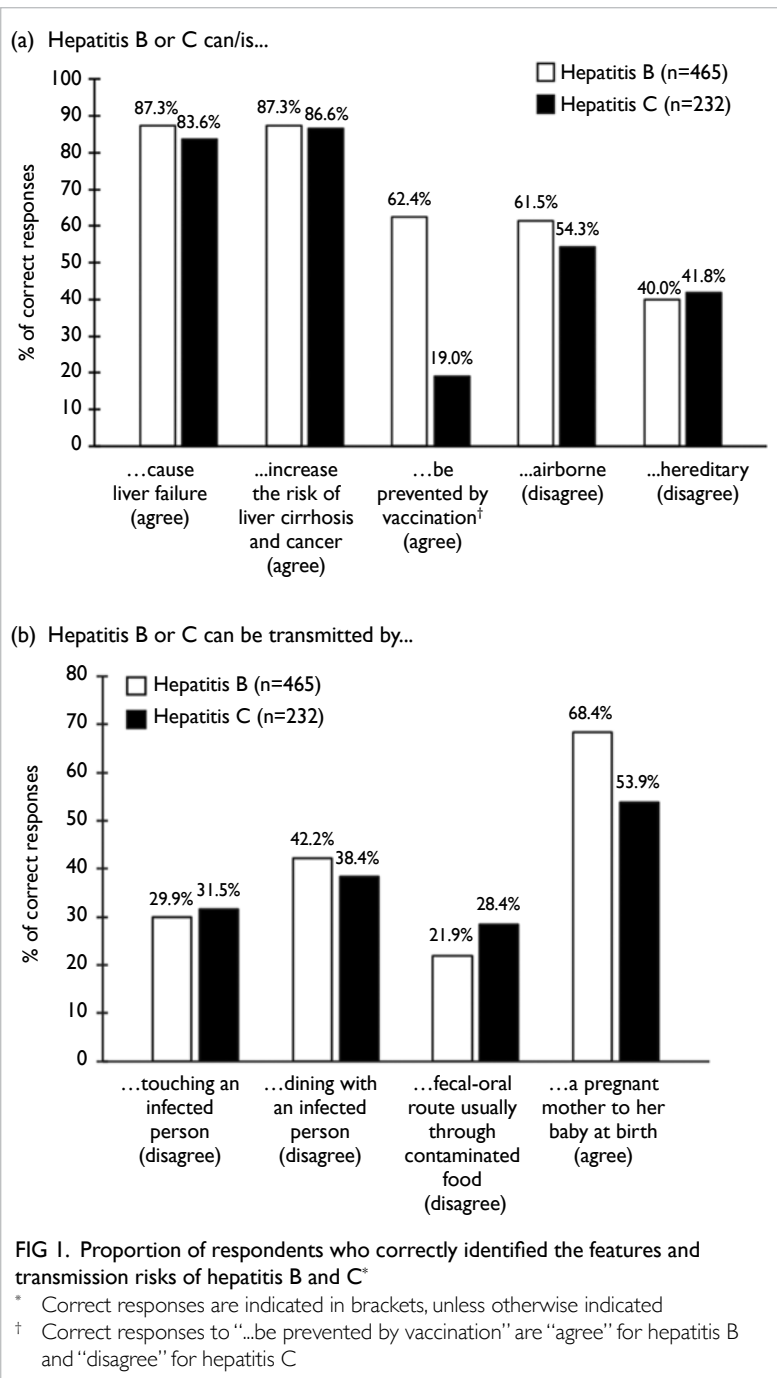
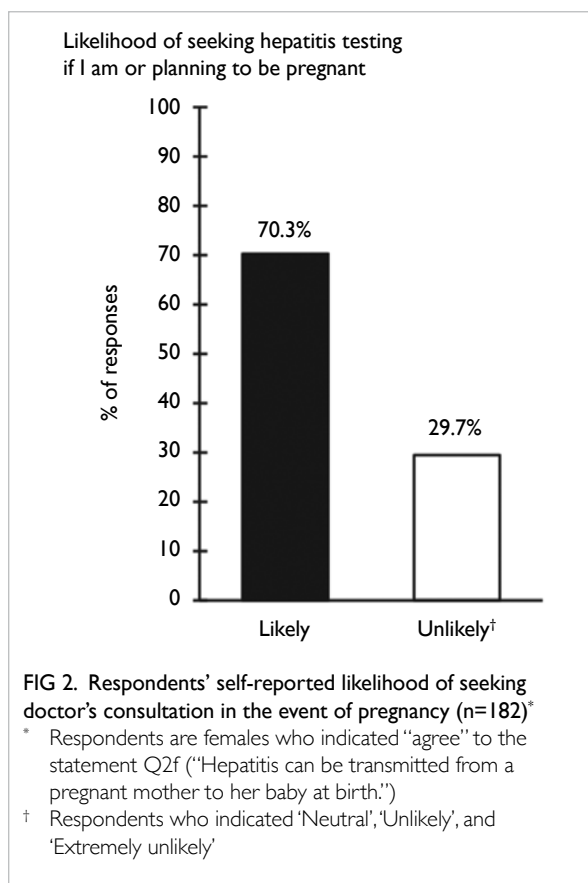


FIG 1. Proportion of respondents who correctly identified the features and transmission risks of hepatitis B and C\*

\* Correct responses are indicated in brackets, unless otherwise indicated

† Correct responses to "...be prevented by vaccination" are "agree" for hepatitis B and "disagree" for hepatitis C





**TABLE 2. Characteristics of respondents who indicated their likelihood of seeking viral hepatitis testing/screening\***

	Likely	Unlikely†
Likelihood of seeking viral hepatitis testing if I am or planning to be pregnant	128 (70.3%)	54 (29.7%)
Age, y		
<25	16 (53.3%)	14 (46.7%)
25-34	25 (67.6%)	12 (32.4%)
35-44	31 (83.8%)	6 (16.2%)
45-54	27 (69.2%)	12 (30.8%)
55-64	28 (77.8%)	8 (22.2%)
≥65	1 (33.3%)	2 (66.7%)
Education level		
Primary school	0	2 (100%)
Secondary school	46 (64.8%)	25 (35.2%)
University	71 (74.7%)	24 (25.3%)
Postgraduate	11 (78.6%)	3 (21.4%)
Household income, HKD		
<\$10 000	4 (80.0%)	1 (20.0%)
\$10 000-\$16 999	1 (14.3%)	6 (85.7%)
\$17 000-\$29 999	28 (77.8%)	8 (22.2%)
\$30 000-\$49 999	47 (70.1%)	20 (29.9%)
≥\$50 000	47 (71.2%)	19 (28.8%)
Declined to answer	1 (100%)	0

\* Data are shown as No. (%). Respondents are females who indicated "agree" to the statement Q2f ("Hepatitis can be transmitted from a pregnant mother to her baby at birth.")

† Respondents who indicated 'Neutral', 'Unlikely', and 'Extremely unlikely'

About one-fifth of the respondents with university (25.3%) or postgraduate (21.4%) education indicated that they were unlikely (neutral, unlikely, or extremely unlikely) to get tested for viral hepatitis in the event of pregnancy planning. About 40% of the respondents aged <25 years (46.7%) expressed that they were unlikely to seek screening if they wanted to become or became pregnant (Table 2).

**Preferred disease information topics and channels**

The top three disease information topics that the respondents stated that they would like to understand more were disease prevention (84.2%), disease symptoms and complications (60.2%), and treatment (59.4%) [Fig 3a].

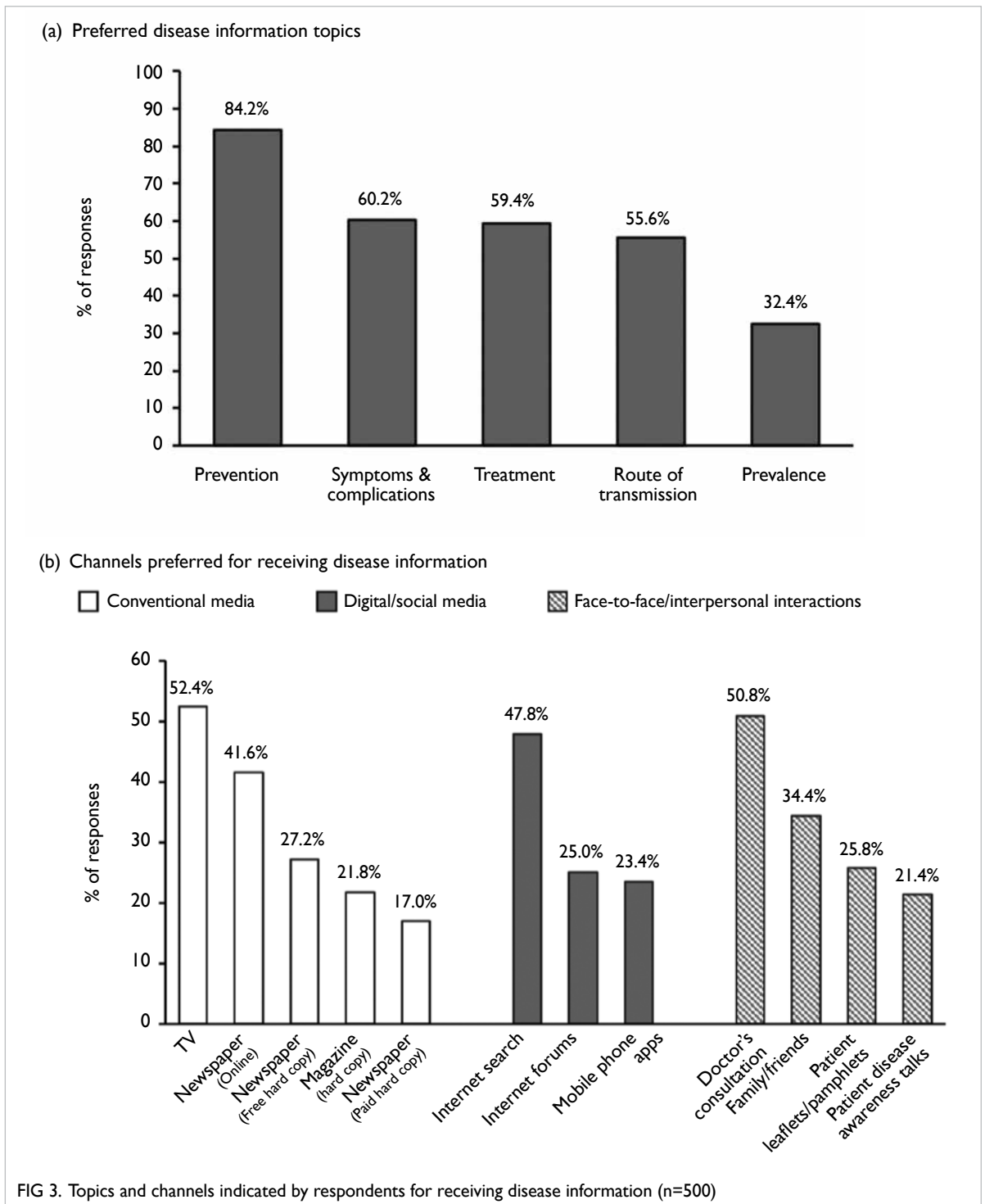
Among the various information dissemination channels, about half of the respondents preferred TV (conventional media [52.4%]), internet search (digital/social media [47.8%]) and doctor's consultation (face-to-face/interpersonal interactions [50.8%]) [Fig 3b].

**Discussion**

There was an improved general awareness (>80%) about the sequelae of HBV and HCV compared

with that observed in 2010 (>70%).<sup>16</sup> However, a substantial proportion (>60%) of respondents across all age-groups and education levels in Hong Kong held misconceptions about HBV and HCV and their transmission risks.

The local awareness of HBV vaccination among Hong Kong respondents (62.4%) was higher than that of Nigeria (31.9%)<sup>17</sup> but lower than that of Singapore (75.1%).<sup>18</sup> Among those unaware of hepatitis B vaccination in Hong Kong, the majority were aged ≥25 years. This is concerning because these respondents were born before the rollout of the local vaccination programme in 1988. Extensive global and local studies have reported that the implementation of HBV vaccination effectively reduced the incidence and seroprevalence of HBV-associated viral hepatitis.<sup>3,6,14,19,20</sup> A recent study in Nigeria showed a relationship between HBV vaccination and knowledge about viral hepatitis,<sup>17</sup> suggesting an unmet need to improve knowledge about HBV to increase HBV vaccination uptake, particularly in older adults.



Moreover, in this study, we observed a general local misperception that a vaccine is available for HCV, which has been similarly observed globally,<sup>18,21</sup> although we observed a slightly higher local awareness rate (19.0%) than that in Singapore (15.0%).<sup>18</sup> This lack of awareness pertaining to HCV might impede the adoption of correct preventive measures against hepatitis C infection.<sup>22</sup>

Both the WHO's hepatitis elimination strategy and HKVHAP 2020-2024 emphasised the importance of combating any forms of stigmatisation or discrimination in the implementation of awareness and communication strategies to improve health outcomes among high-risk individuals.<sup>3,14</sup> Social stigmatisation and discrimination stem from the lack of knowledge within society<sup>12,23</sup> and among

healthcare practitioners.<sup>10</sup> Misperceptions such as the idea that hepatitis can be spread by sharing of food or eating utensils, the faecal-oral route, or touching an infected person (perceived by >60% of the study's respondents) often underlie the social stigmatisation surrounding viral hepatitis.<sup>16,18,23,24</sup> These often result in the avoidance of casual contact, self-isolation,<sup>11,23</sup> or denial of potential employment or professional advancement,<sup>25,26</sup> as experienced by infected individuals across the world. Many respondents without HBV infection in China expressed discomfort about being in close contact or sharing meals with HBV-infected individuals and felt that they should not be allowed to work in restaurants or with children.<sup>25</sup> Similarly, 55.2% respondents in a 2019 Korean survey thought HCV patients should use separate towels and dishes,<sup>27</sup> which is an indication of the misperception of HCV transmission by causal contact.

Over time, these social behaviours arising from misperceptions could result in a paradox for those infected with viral hepatitis, as stigma and shame could lead them to conceal their condition and avoid seeking the necessary medical treatment.<sup>26,28</sup> Therefore, there is a need to adopt a comprehensive approach to raise community awareness and knowledge to tackle stigmatisation against infected individuals.

The belief that viral hepatitis is hereditary (ie, it could be inherited through 'bad genes'<sup>29</sup>) could potentially result in the misunderstanding that there are no preventive measures against viral hepatitis. In fact, mother-to-child transmission is a major route of hepatitis B transmission in Asia. The potential confusion between a vertically transmitted disease and a hereditary one could impede efforts to reduce community transmission of viral hepatitis, as many might not bother to find out more information or proactively seek screening.

The HBsAg seropositivity screening during pregnancy and neonatal vaccination are integral parts of HKVHAP and the WHO's hepatitis elimination strategy to prevent mother-to-child transmission.<sup>3,14</sup> Prevention of perinatal transmission of HBV in Hong Kong includes an additional viral load screening of HBsAg-seropositive mothers to guide maternal antiviral therapy. Approximately 70% of pregnant women in Hong Kong (between May 2017 and December 2019) reportedly did not undergo viral load testing or regular hepatological surveillance before pregnancy.<sup>30</sup> This is an important public health issue, as viral load in mothers who are hepatitis B carriers is a key influencing factor of immunoprophylaxis success in their babies.<sup>31</sup> Among the 280 female respondents, only 128 (45.7%) were aware of the risk of mother-to-child transmission and likely to seek medical consultation in the event of pregnancy, suggesting a gap in women's awareness

and knowledge about viral hepatitis in Hong Kong.

Besides vertical transmission, horizontal spread is also an important means of HBV infection. In this study, 67.6% of respondents were unaware of their family's history of liver disease(s), and only 50% knew that sexual contact is a transmission risk of HBV and HCV (online supplementary Appendix 2). This suggests an unmet need to educate the community about not only mother-to-child transmission, but also other transmission risks. More robust education efforts are needed to raise the population's level of knowledge and awareness about viral hepatitis to work towards the WHO's elimination goal. Such outreach efforts could be aligned with the respondents' preferences for information media channels such as TV, internet search, and doctor's consultation to optimise community reception.

This study has some limitations. Being a self-administered cross-sectional study based on self-reported data, the study is subject to recall bias. As such, data validation could not be performed, and no causal associations could be made. Respondents who lack internet access or comfort with online administration could be underrepresented. Furthermore, this study did not consider factors that could influence respondents' levels of knowledge and/or awareness or attitudes towards HBV and HCV (eg, respondents' health consciousness or vaccination or hepatitis status). With <60% having attended a health screening in the past 2 years and <70% expressing a high likelihood of medical consultation when exposed to risk factors, it would be insightful to explore the reasons for these gaps in proactive health-seeking behaviours. This would facilitate addressing and dispelling concerns to promote precautionary measures and health-seeking behaviours to reduce community transmission.

As this study is exploratory and descriptive in nature, statistical analyses were not performed to evaluate factors associated with the gaps in knowledge, awareness, and/or practices pertaining to hepatitis B and C; thus, the associations of respondents' characteristics could not be identified in this study. Additional analyses would be warranted in future studies to confirm any independent factors associated with the community's levels of knowledge and awareness.

## Conclusions

In this study, we found that respondents had a general awareness of hepatitis B and C. However, our findings revealed gaps in respondents' knowledge and understanding of the transmission risks of hepatitis B and C as well as awareness of their family history related to liver disease(s). The findings suggest that there may be social stigmatisation or discrimination against people with HBV and HCV

within the community, which may deter some from undergoing screening and diagnosis.

It is essential to develop targeted education strategies with special attention towards addressing misperceptions relevant to social stigmatisation or discrimination and raise the importance of preventive measures such as vaccination and screening when exposed to risk factors. Outreach of such targeted education efforts should be aligned with the community's preferred information channels to maximise information accessibility.

### Author contributions

Concept or design: All authors.

Acquisition of data: S Singh.

Analysis or interpretation of data: All authors.

Drafting of the manuscript: All authors.

Critical revision of the manuscript for important intellectual content: All authors.

All authors had full access to the data, contributed to the study, approved the final version for publication, and take responsibility for its accuracy and integrity.

### Conflicts of interest

HLY Chan is an advisor to AbbVie, Aligos, Arbutus, Gilead Sciences, GSK, Hepion, Janssen, Merck, Roche, Vaccitech, Venatorx, and Vir Biotechnology; and a speaker for Gilead Sciences, Mylan, and Roche.

GLH Wong has served as an advisory committee member for Gilead Sciences; as a speaker for Abbott, Abbvie, Bristol-Myers Squibb, Echosens, Furui, Gilead Sciences, Janssen and Roche; and received a research grant from Gilead Sciences.

VWS Wong served as a consultant or advisory board member for 3V-BIO, AbbVie, Allergan, Boehringer Ingelheim, the Center for Outcomes Research in Liver Diseases, Echosens, Gilead Sciences, Hanmi Pharmaceutical, Intercept, Inventiva, Merck, Novartis, Novo Nordisk, Perspectum Diagnostics, Pfizer, ProSciento, Sagimet Biosciences, TARGET PharmaSolutions, and Terns; and a speaker for AbbVie, Bristol-Myers Squibb, Echosens, and Gilead Sciences. He has received a grant from Gilead Sciences for fatty liver research. He is also a Co-founder of Illuminatio Medical Technology Limited.

As an editor of the Journal, MCS Wong was not involved in the peer review process for this article.

### Acknowledgement

The authors acknowledge valuable support from Dr Vince Grillo of Kantar Health overseeing the development of the project. The authors thank Dr Amanda Woo of Kantar Health for providing medical writing and editorial support, which was funded by Gilead Sciences, Hong Kong, in accordance with Good Publication Practice (GPP3) guidelines (<http://www.ismpp.org/gpp3>). The translation of the questionnaire from English to traditional Chinese was performed by GlobaLexicon Limited, United Kingdom and funded by Gilead Sciences, Hong Kong. The authors acknowledge the members of the steering committee for their contribution in reviewing and finalising the questionnaire: Dr Mei-hsuan Lee, National

Yang Ming Chiao Tung University (Taiwan); Dr Sang-hoon Ahn, Yonsei University College of Medicine (South Korea); Dr Henry LY Chan, Union Hospital (Hong Kong); Dr Asad Choudhry, Chaudhry Hospital (Pakistan); Dr Rino Alvani Gani, University of Indonesia (Indonesia); Dr Rosmawati Mohamed, University of Malaya (Malaysia), Dr Janus P Ong, University of the Philippines (Philippines); Dr Akash Shukla, King Edward Memorial Hospital, Global Hospital (India); Dr Chee-kiat Tan, Singapore General Hospital (Singapore); Dr Tawesak Tanwandee, Siriraj Hospital, Mahidol University (Thailand); and Dr Pham-thi Thu Thuy, Ho Chi Minh Medic Medical Center (Vietnam).

### Funding/support

This study was funded by Gilead Sciences, Hong Kong. Kantar Health, Singapore, received funding from Gilead Sciences, Hong Kong, for the conduct of the study and development of the manuscript.

### Ethics approval

All eligible respondents explicitly agreed to join the panel and provided informed online consent to participate in the study.

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