Determinants of Overall Knowledge and Health Behaviors Towards Hepatitis B and C Among Ever-Married Women in Pakistan: Evidence Based on Demographic and Health Survey 2017–18

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Abstract

Background: In 2019, around 5 million and 10 million people were affected by hepatitis B virus (HBV) and hepatitis C virus (HCV) respectively in Pakistan. On World Hepatitis Day 2019, Pakistan's Government announced the Prime Minister's Plan to eliminate HBV and HCV from the country by 2030. In order to achieve this goal, adequate knowledge about HBV and HCV regarding mode of transmission, symptoms of the disease, and awareness about available treatments and vaccines is imperative. The present study aims to investigate the determinants related to overall knowledge about and behaviour in relation to HBV and HCV amongst married women in Pakistan.

Methods: Secondary data analysis was carried out using the Pakistan Demographic and Health Survey (PDHS) 2017–18. A series of questions regarding women's knowledge about how to avoid HBV and HCV and their health behaviour in relation to HBV and HCV were posed to 12,364 ever-married women of reproductive age (15–49 years). Bivariate and multivariable logistic regression was applied to examine the effects of socio-demographic characteristics and covariates on women's overall knowledge and health behaviour regarding HBV and HCV.

Results: The findings highlight that the majority of women (88.3%) have heard of HBV and HCV. Nonetheless, only 34.8% had comprehensive knowledge about how to avoid HBV and HCV. Few women (11.3%) had been tested for HBV or HCV during the year preceding the survey. Furthermore, the results indicated that women from Sindh, living in urban areas, aged 35 years and over, having more than 10 years of schooling, belonging to the richest wealth quintile and working as professionals or in clerical/sales & service jobs reported better knowledge and health behaviours regarding HBV and HCV.

Conclusion: This study provides evidence that women's socio-demographic characteristics create differences in their overall knowledge about and attitudes towards HBV and HCV. This research emphasized that there is a need to create awareness about the causes and prevention of HBV and HCV in order to achieve the goal of eliminating these diseases in Pakistan by 2030.

Background

Hepatitis B and C infections cause a range of ailments, ranging from asymptomatic to life-threatening disease [1]. According to estimates by the World Health Organization (WHO), globally 325 million people are affected by hepatitis B virus (HBV) and hepatitis C virus (HCV), resulting in 1.4 million deaths across the world per year. The WHO's data shows that around 5 million and 10 million people were affected by HBV and HCV respectively in Pakistan during 2019 [2]. A lack of preventive measures, testing services, or treatment resources, the use of unsterilized invasive medical instruments and transfusions of infected blood are the leading causes of high HBV and HCV rates [2, 3]. Furthermore, the data suggests that the primary cause of hepatocellular carcinoma is either hepatitis C or hepatitis B in Pakistan [4]. In October 2017, following the WHO's Global Health Sector Strategy (GHSS), Pakistan's Government launched the first National Hepatitis Strategic Framework (2017–2021), aiming to reduce the incidence and chronic

cases of hepatitis B and C by 10% and 30%, respectively [2, 5]. In addition to this, on World Hepatitis Day 2019, Pakistan's Government also announced the Prime Minister's Plan to eliminate HBV and HCV from the country by 2030. Through this plan, the federal government aims to facilitate provincial governments in providing leadership and coordination to scale up preventive, testing and treatment services for hepatitis [2].

Despite the governmental efforts and commitment, HBV and HCV are still serious public health challenges in Pakistan. Adequate knowledge about HBV and HCV, regarding mode of transmission, symptoms of disease and awareness about available treatments and vaccines is very important for encouraging a favourable attitude towards seeking treatment and avoiding the spread of infections [6, 7]. A previous study conducted in Pakistan indicated that married women had poor and incorrect knowledge about the causes, prevention and treatment of HBV [8]. It is evident through research findings that pregnant women are more at risk, if infected, of transmitting viral hepatitis B and C via sexual, vertical (mother to child during childbirth) and horizontal routes (e.g., blood transfusions and contaminated injections). Therefore, married women's knowledge about HBV and HCV is crucial for controlling the disease [9, 10].

In light of the above context, there is a dire need for research to understand the determinants of overall knowledge about HBV and HCV among married women. Women who have adequate knowledge about the causes, prevention and treatment of HBV and HCV can be expected to take precautionary measures to avoid the spread of disease and to access treatment services. Previous studies suggest that, in Pakistan, hepatitis B patients lack information about attitudes and practices regarding the prevention of disease [6], and that women have less knowledge about HBV and HCV than men [11]. However, the findings of a study conducted among medical students in Pakistan revealed that female students have more diagnostic knowledge about HBV and HCV than male students [12]. The findings of another study with male respondents revealed that respondents have low levels of knowledge about HBV and HCV, which leads to unfavourable attitudes towards the practising of preventive measures [13].

The studies referred to above with reference to Pakistan were carried out with small sample sizes and lacked evidence of married women's knowledge and behaviour regarding HBV and HCV. Hence, the present study aims to bridge this research gap, based on a larger sample that is representative of the population of Pakistan. Its prime objective is to investigate various determinants affecting overall knowledge and behaviour relating to HBV and HCV amongst married women in Pakistan.

Theoretical framework

The theoretical foundation of this research draws upon knowledge, attitude, practice (KAP) theory, which combines aspects of knowledge, attitudes and practice [14], and the WHO's framework of social determinants of health [15].

The assumptions of KAP theory indicate that modifications occur in the health behaviour of individuals after seeking health education and knowledge. It provides a rational model linking health education and

behavioural changes [16]. The core postulate of KAP theory emphasizes three successive stages through which an individual's behaviour passes in order to adapt to changes. These stages are: acquisition of related knowledge, attitude modification and formation of behaviour. Furthermore, KAP theory postulates that acquiring sufficient knowledge regarding symptoms, causes and ways to prevent disease inculcates positive attitudes among individuals about following preventive methods and seeking medical care. Several previous studies have reported that individuals' KAP level was significantly linked to addressing false perceptions, management of illness, seeking healthcare services and embracing disease-preventive behaviour [17–21].

Furthermore, the social determinants of the health framework emphasize the role of individuals' sociodemographic factors in determining their health. It indicates that individuals' health status may vary depending upon their sociodemographic characteristics [22]. The findings of past studies indicate that low socioeconomic strata are linked with low levels of treatment compliance, the inaccessibility of healthcare facilities and insufficient ability to afford medical treatment [23–26]. The literature also reveals that gender, age, level of education and income affect an individual's knowledge and behaviour in terms of seeking good health [27, 28].

Based on the postulates of KAP theory and the social determinants of health framework, this research explored the social factors linked to the knowledge and behaviour of ever-married women in Pakistan regarding HBV and HCV.

Methods

Study design

This research conducted secondary data analysis, using the fourth and latest Pakistan Demographic and Health Survey (PDHS) 2017–18. Currently, PDHS 2017–18 provides the largest national representative estimates of demographic and health indicators in Pakistan. Furthermore, it provides the largest dataset of variables related to HBV and HCV knowledge among the general population. PDHS 2017–18 is a cross-sectional survey, adopting a stratified two-stage sample design. The stratification was based on urban and rural areas, and a total of 16 strata were obtained, consisting of eight strata each for urban and rural areas. During the first stage, 580 clusters consisting of enumeration blocks were selected, while in the second stage, 16,240 households (28 households per cluster) were selected, using a probability systematic selection process.

PDHS 2017–18 collected data on different types of questionnaires. In the present study, data obtained through the women's questionnaire was used. The women's questionnaire was administered to 12,364 ever-married women of reproductive age (15–49 years). This women's questionnaire included questions regarding women's knowledge and behaviour regarding hepatitis B and C.

Outcome variables

In this study, women's awareness, knowledge/health beliefs about HBV or HCV, and health behaviour are taken as outcome variables. Initially, women' awareness was explored, if they had ever heard of illnesses called HBV or HCV ("Yes"/"No"). Women who replied "yes" were asked further questions to inquire about their knowledge and health behaviour regarding HBV or HCV.

Women's overall knowledge or health beliefs about HBV or HCV was inferred from the following question: "Is there anything a person can do to avoid getting HBV or HCV?" ("Yes"/"No"/"Don't know"). Women who replied "yes" were further asked: "What can a person do to avoid getting HBV or HCV?" Possible responses to this question included six options: "practice safe sex", "safe blood transfer", "use disposable syringe", "avoid contaminated food/water", "avoid contact with infected person", and "ensure dentists' instruments properly sterilized". Respondents who replied correctly were coded as 1, while those who replied incorrectly or "don't know" were coded as 0. Hence, the score for women's knowledge about HBV or HCV ranged from 0 to 6. This score was dichotomized into no knowledge (score 0) vs. some knowledge (score 1–6).

Health behaviour was determined through the following question: 1) "Have you ever been tested for HBV or HCV?" ("Yes"/"No"). 2) Respondents who reported "yes" were asked about their recent test: "How many months ago was your most recent test for HBV or HCV?" ("Within the last year"/"More than one years ago").

Independent variables

In this study, women's healthcare decision-making autonomy, exposure to mass media to access information, health insurance coverage and the accessibility of distant healthcare facilities were taken as independent variables, which may influence women's knowledge and behaviour about HBV or HCV.

Women's healthcare autonomy measures their overall contribution towards decisions about healthcare ("Who usually decides about your healthcare?"). Possible responses were: "respondent alone", "husband/partner alone", "respondent and husband/partner jointly", "respondent and other person", and "someone else or others". For this study, responses to the above question were dichotomized into one of two categories: whether the woman has "a say at all" (either alone or jointly with her husband/partner or jointly with another person) or whether she has "no say at all" (in cases where her husband/partner alone, someone else or others make the decisions). Exposure to mass media to access information measures the women's frequency of reading a newspaper, watching TV or listening to the radio, and was grouped into two categories ("Yes"/"No"). Furthermore, women were asked about health insurance coverage ("Yes"/"No") and the accessibility of distant healthcare facilities for seeking medical services ("big problem"/"not a big problem").

A set of sociodemographic variables was included: geographical classification ("urban"/"rural"), region/province (Punjab; Sindh; Khyber Pakhtunkhwa; Baluchistan; Gilgit Baltistan; Islamabad), age of respondents (in years), educational status of respondents and husbands, employment/occupation of respondents and husbands, household wealth quintile. Women's age was grouped into three categories

("15–24 years"/"25–34 years"/"35 years and above"). The educational status of women and their spouses/husbands was grouped into four categories ("uneducated/no formal schooling"/"up to 5 years of schooling"/"6–10 years of schooling"/"more than 10 years of schooling"). The employment/occupation of respondents and their spouses/husbands was grouped into four categories ("not working or unemployed"/"professional, clerical, sales & services"/ "agriculture"/"manual or household worker").

Statistical analysis

SPSS version 21 was used for the data analysis. We applied sampling weights for all analyses. Descriptive statistics were employed for sociodemographic characteristics. Measures of women's awareness, overall knowledge and health behaviour regarding hepatitis B or C, women's healthcare decision-making autonomy, exposure to mass media and health insurance coverage were compiled in the form of frequencies and percentages. Multicollinearity between variables was examined using a variance inflation factor (VIF). However, no multicollinearity ($VIF \geq 10$) was observed.

Bivariate and multivariable logistic regression models were applied to investigate the effect of sociodemographic characteristics and further independent variables on women's overall knowledge related to HBV and HCV. The results are presented as odds ratios (OR) and adjusted odds ratios (AOR) with 95% confidence intervals (CI).

Results

Sociodemographic characteristics and covariates

Table 1 describes the sociodemographic characteristics and covariates of the sample of 12,364 ever-married women. The majority resided in rural areas (63.2%) and belonged to the age group 25–34 years (40.1%). With reference to educational status, the majority of respondents (49.2%) had no formal schooling, while 21.2% had completed 6–10 years of schooling, and only 13.1% had attained more than 10 years of schooling. The majority of respondents (80.1%) were unemployed. Most of the respondents (66%) had access to mass media and half (50.5%) reported that they had autonomy in making healthcare decisions. Furthermore, a significant percentage (42.0%) of respondents reported that the accessibility of distant healthcare facilities for seeking medical services was a problem, and almost all respondents (98.6%) had no health insurance coverage.

Table 1
Sample description (n = 12,364)

Characteristics	n	%
Sociodemographic characteristics		
Regions/Provinces		
Punjab	6,630	53.6
Sindh	2,850	23.1
Baluchistan	642	5.2
Khyber Pakhtunkhwa	1,901	15.4
Islamabad Capital Territory	107	0.9
FATA	234	1.9
Geographical classification		
Urban	4,550	36.8
Rural	7,814	63.2
Respondent's age		
15–24 years	2,489	20.1
25–34 years	4,961	40.1
35 years and above	4,915	39.8
Respondent's educational status		
No formal schooling	6,080	49.2
Up to 5 years of schooling	2,097	16.5
6–10 years of schooling	2,623	21.2
More than 10 years of schooling	1,624	13.1
Respondent's Occupation		
Not working / unemployed	9,894	80.1
Professional, clerical, sales & services	648	5.2
Agriculture	778	6.3
Manual or Household worker	1,034	8.4
Husband's educational status		
No formal schooling	3,480	29.5

Characteristics	n	%
Up to 5 years of schooling	1,840	15.6
6–10 years of schooling	4,165	35.3
More than 10 years of schooling	2,310	19.6
Husband's occupation		
Not working / unemployed	489	4.1
Professional, clerical, sales & services	3,980	33.7
Agriculture	2,013	17.1
Manual or household worker	5,324	45.1
Wealth quintile		
Richest	2,579	20.9
Richer	2,594	21
Middle	2,504	20.3
Poorer	2,430	19.7
Poorest	2,258	18.3
Covariates		
Exposure to mass media / Access to information		
Yes	8,153	66.0
No	4,200	34.0
Healthcare decision-making / Autonomy		
Yes	5,979	50.5
No	5,850	49.5
Accessibility to distant health facility for seeking medical services		
Big problem	5,191	42.0
Not a big problem	7,164	58.0
Health insurance coverage		
Yes	177	1.4
No	12,187	98.6

Awareness, overall knowledge and health behaviour

The majority of respondents (88.3%) were aware of HBV and HCV. With reference to women's knowledge of HBV and HCV, it was found that more than half of respondents (57.4%) were aware of various ways to avoid HBV and HCV. However, only some of the respondents (34.8%) were found to have comprehensive knowledge about how to avoid HBV and HCV (Table 2). Upon probing, the results showed that less than one-fifth of women reported contaminated water and food (17.9%) or use of an infected syringe (12.8%) as the main risk factors for HBV and HCV. Furthermore, some of the women were also found to be aware of safe sex practices (6.8%), safe blood transfusion (9.4%), and refraining from contact with an infected person (7.9%) to avoid HBV and HCV (Fig. 1).

Table 2
Awareness, knowledge and health behavior regarding hepatitis B or C (n = 12,364)

Characteristics	n	%
Women has ever heard of hepatitis B or C		
Yes	10,919	88.3
No	1,445	11.7
Women's awareness about various ways to avoid hepatitis B or C		
Yes	4,654	57.4
No	6,264	42.6
Women's comprehensive knowledge to avoid hepatitis B or C		
Yes	3,804	34.8
No	7,114	65.2
Ever been tested for hepatitis B or C		
Yes	3,174	25.7
No	7,745	62.6
Months ago tested for hepatitis B or C		
Within last year	1,437	45.3
More than one year ago	1,735	54.7

Table 3

Association of women's knowledge and health behavior on hepatitis B or C with sociodemographic characteristics and covariates (n = 12,364)

Characteristics	Knowledge about hepatitis B or C			Health behavior about hepatitis B or C		
	Yes	No	p-value*	Yes	No	p-value*
Regions/provinces						
Punjab	34.2	65.8	< 0.01	29.8	70.2	< 0.01
Sindh	41	59		34.8	65.2	
Baluchistan	28.3	71.7		18.2	81.8	
Khyber Pakhtunkhwa	31	69		21.9	78.1	
Islamabad Capital Territory	56.1	43.9		38.8	61.2	
FATA	17.6	82.4		19	81	
Geographical classification						
Urban	46	54	< 0.01	38.1	61.9	< 0.01
Rural	28	72		23.5	76.5	
Respondent's age						
15–24 years	25.2	74.8	< 0.01	18.2	81.8	< 0.01
25–34 years	35.8	64.2		31.6	68.4	
35 years and above	38.4	61.6		31.6	68.4	
Respondent's educational status						
No formal schooling	23.9	76.1		22	78	
Up to 5 years of schooling	33.4	66.6		26.2	73.8	
6–10 years of schooling	40.9	59.1		33.1	66.9	
More than 10 years of schooling	62.5	37.5		48.8	51.2	
Respondent's occupation						
Not working / unemployed	35.1	64.9	< 0.01	29.1	70.9	< 0.01
Professional, clerical, sales & services	52.2	47.8		41.8	58.2	
Agriculture	16.9	83.1		17.8	82.2	

* Chi-square test was applied

Characteristics	Knowledge about hepatitis B or C			Health behavior about hepatitis B or C		
	Yes	No	p-value*	Yes	No	p-value*
Manual or household worker	33.6	66.4		28.7	71.3	
Husband's educational status						
No formal schooling	23.8	76.2	< 0.01	19.9	80.1	< 0.01
Up to 5 years of schooling	30.2	69.8		27.6	72.4	
6–10 years of schooling	35.3	64.7		29.3	70.7	
More than 10 years of schooling	53	47		42.2	57.8	
Husband's occupation						
Not working / unemployed	29.4	70.6	< 0.01	23.8	76.2	< 0.01
Professional, clerical, sales & services	44.3	55.7		37.3	62.7	
Agriculture	24.2	75.8		23	77	
Manual or household worker	32.1	67.9		25.6	74.4	
Wealth quintile						
Richest	55.3	44.7	< 0.01	43.9	56.1	< 0.01
Richer	38.1	61.9		33.6	66.4	
Middle	32.2	67.8		26.1	73.9	
Poorer	23	77		18.9	81.1	
Poorest	19.9	80.1		18.6	81.4	
Exposure to mass media / Access to information						
Yes	39.9	60.1	< 0.01	32.9	67.1	< 0.01
No	24.1	75.9		21.0	79.0	
Healthcare decision-making / Autonomy						
Yes	39.8	60.2	< 0.01	32.0	68.0	< 0.01
No	29.8	70.2		26.0	74.0	
Accessibility to distant health facility for seeking medical services						

* Chi-square test was applied

Characteristics	Knowledge about hepatitis B or C			Health behavior about hepatitis B or C		
	Yes	No	p-value*	Yes	No	p-value*
Big problem	29.1	70.9	< 0.01	23.8	76.2	< 0.01
Not a big problem	38.8	61.2		32.8	67.2	
Health insurance coverage						
Yes	41.3	58.7	0.07	42.4	57.6	< 0.01
No	34.7	65.3		28.9	71.1	
* Chi-square test was applied						

With reference to women's health behaviour towards HBV and HCV, some of the respondents (25.7%) had been tested for HBV and HCV at some point (Table 2).

Association of women's overall knowledge and health behaviour regarding HBV and HCV with respondents' characteristics

Respondents' overall knowledge about HBV and HCV was found to be high among respondents from Islamabad Capital Territory (56.1%) and Sindh (41.0%), those living in urban areas (46.0%), in the age group of 35 years and above (38.4%), with more than 10 years of schooling (62.5%), working in professional, clerical, sales & services jobs (52.2%), and belonging to the richest wealth quintile (55.3%). Respondents having mass media exposure (39.9%) and autonomy to make decisions about healthcare (39.8%) indicated better knowledge about HBV and HCV than their counterparts. Furthermore, the overall knowledge about HBV and HCV was found to be high amongst those respondents who had access to distant healthcare facilities for medical services (38.8%) and health insurance coverage (41.3%). Similar trends were also found in the results for respondents' health behaviour relating to HBV and HCV.

A statistically significant association ($p < 0.05$) of both variables, i.e. overall knowledge and health behaviour relating to HBV and HCV, was observed with respondents' age, the educational status of respondents and their husbands, the occupation of respondents and their husbands, wealth quintile, exposure to mass media, autonomy to make decisions about healthcare, accessibility of distant healthcare facilities and health insurance coverage.

Bivariate and multivariable logistic regression

The results of the bivariate and multivariable logistic regression analysis of women's overall knowledge (Table 4) and health behaviour (Table 5) regarding HBV and HCV related to sociodemographic characteristics and covariates are presented below.

Table 4

Bivariate and multivariable logistic regression models of women's knowledge on hepatitis B or C (n = 12,364)

Characteristics	Knowledge about hepatitis B or C					
	Bivariate			Multivariable		
	OR	95% CI	p-value	AOR	95% CI	p-value
Regions/provinces						
FATA	1			1		
Punjab	2.41	1.70–3.42	< 0.01	1.04	0.71–1.51	0.85
Sindh	3.23	2.26–4.60	< 0.01	1.82	1.25–2.67	< 0.01
Baluchistan	1.82	1.22–2.73	< 0.01	1.28	0.84–1.97	0.24
Khyber Pakhtunkhwa	2.08	1.45–2.98	< 0.01	1.29	0.88–1.88	0.18
Islamabad Capital Territory	5.92	3.49–10.03	< 0.01	1.66	0.94–2.94	0.08
Geographical classification						
Rural	1			1		
Urban	2.19	2.02–2.37	< 0.01	1.03	0.92–1.14	0.64
Respondent's Age						
15–24 years	1			1		
25–34 years	1.65	1.47–1.86	< 0.01	1.49	1.31–1.69	< 0.01
35 years and above	1.84	1.64–2.07	< 0.01	1.83	1.61–2.09	< 0.01
Respondent's educational status						
No formal schooling	1			1		
Up to 5 years of schooling	1.60	1.42–1.79	< 0.01	1.39	1.22–1.59	< 0.01
6–10 years of schooling	2.21	1.99–2.45	< 0.01	1.52	1.33–1.74	< 0.01

Characteristics	Knowledge about hepatitis B or C					
	Bivariate			Multivariable		
	OR	95% CI	p-value	AOR	95% CI	p-value
More than 10 years of schooling	5.32	4.72–6.01	< 0.01	2.66	2.25–3.14	< 0.01
Husband's educational status						
No formal schooling	1			1		
Up to 5 years of schooling	1.39	1.21–1.59	< 0.01	1.09	0.94–1.27	0.21
6–10 years of schooling	1.75	1.57–1.96	< 0.01	1.08	0.95–1.22	0.24
More than 10 years of schooling	3.62	3.21–4.08	< 0.01	1.36	1.16–1.58	< 0.01
Respondent's occupation						
Not working / unemployed	1			1		
Professional, clerical, sales & services	2.02	1.71–2.38	< 0.01	1.48	1.23–1.79	< 0.01
Agriculture	0.37	0.31–0.46	< 0.01	0.72	0.57–0.91	< 0.01
Manual or household worker	0.94	0.81–1.08	0.37	1.17	0.99–1.37	0.05
Husband's occupation						
Not working / unemployed	1			1		
Professional, clerical, sales & services	1.89	1.52–2.36	< 0.01	1.15	0.91–1.45	0.25
Agriculture	0.76	0.60–0.96	0.02	0.91	0.71–1.18	0.49
Manual or household worker	1.13	0.91–1.40	0.26	1.11	0.88–1.39	0.39
Wealth quintile						
Poorest	1			1		
Poorer	1.20	1.03–1.40	0.02	1.18	0.99–1.39	0.06

Characteristics	Knowledge about hepatitis B or C					
	Bivariate			Multivariable		
	OR	95% CI	p-value	AOR	95% CI	p-value
Middle	1.91	1.65–2.21	< 0.01	1.61	1.34–1.92	< 0.01
Richer	2.47	2.15–2.85	< 0.01	1.62	1.33–1.96	< 0.01
Richest	4.96	4.31–5.70	< 0.01	2.45	1.97–3.04	< 0.01
Exposure to mass media / Access to information						
No	1			1		
Yes	2.09	1.91–2.29	< 0.01	1.08	0.96–1.21	0.18
Healthcare decision-making / Autonomy						
No	1			1		
Yes	1.55	1.43–1.68	< 0.01	1.22	1.11–1.34	< 0.01
Accessibility to distant health facility for seeking medical services						
Big problem	1			1		
Not a big problem	1.54	1.42–1.67	< 0.01	0.85	0.77–0.94	0.01
Health insurance coverage						
No	1			1		
Yes	1.32	0.97–1.80	0.07	1.16	0.82–1.64	0.39

Table 5

Bivariate and multivariable logistic regression models of women's health behavior on hepatitis B or C (n = 12,364)

Characteristics	Health behavior about hepatitis B or C					
	Bivariate			Multivariate		
	OR	95% CI	p-value	AOR	95% CI	p-value
Regions/provinces						
FATA	1			1		
Punjab	1.78	1.27–2.50	< 0.01	0.96	0.67–1.38	0.84
Sindh	2.24	1.59–3.17	< 0.01	1.37	0.95–1.99	0.09
Baluchistan	0.94	0.62–1.42	0.77	0.68	0.44–1.06	0.08
Khyber Pakhtunkhwa	1.18	0.83–1.68	0.36	0.79	0.55–1.16	0.23
Islamabad Capital Territory	2.64	1.56–4.48	< 0.01	0.99	0.57–1.74	0.98
Geographical classification						
Rural	1			1		
Urban	2.01	1.84–2.18	< 0.01	1.09	0.98–1.23	0.10
Respondent's age						
15–24 years	1			1		
25–34 years	2.08	1.83–2.36	< 0.01	1.92	1.68–2.19	< 0.01
35 years and above	2.07	1.82–2.36	< 0.01	2.01	1.74–2.31	< 0.01
Respondent's educational status						
No formal schooling	1			1		
Up to 5 years of schooling	1.26	1.11–1.42	< 0.01	1.02	0.88–1.17	0.78
6–10 years of schooling	1.75	1.57–1.95	< 0.01	1.20	1.04–1.38	0.01
More than 10 years of schooling	3.37	2.99–3.79	< 0.01	1.70	1.43–2.02	< 0.01

Characteristics	Health behavior about hepatitis B or C					
	Bivariate			Multivariate		
	OR	95% CI	p-value	AOR	95% CI	p-value
Husband's educational status						
No formal schooling	1			1		
Up to 5 years of schooling	1.53	1.33–1.77	< 0.01	1.28	1.10–1.48	< 0.01
6–10 years of schooling	1.66	1.48–1.86	< 0.01	1.14	0.99–1.30	0.05
More than 10 years of schooling	2.93	2.58–3.32	< 0.01	1.34	1.14–1.57	< 0.01
Respondent's occupation						
Not working / unemployed	1			1		
Professional, clerical, sales & services	1.75	1.48–2.06	< 0.01	1.29	1.07–1.56	< 0.01
Agriculture	0.52	0.43–0.64	< 0.01	0.88	0.70–1.11	0.29
Manual or household worker	0.98	0.84–1.14	0.81	1.12	0.94–1.32	0.19
Husband's occupation						
Not working / unemployed	1			1		
Professional, clerical, sales & services	1.90	1.51–2.39	< 0.01	1.25	0.98–1.60	0.07
Agriculture	0.95	0.74–1.22	0.71	1.04	0.80–1.35	0.76
Manual or household worker	1.09	0.87–1.38	0.43	1.03	0.81–1.31	0.81
Wealth quintile						
Poorest	1			1		
Poorer	1.02	0.87–1.19	0.81	1.06	0.89–1.27	0.52
Middle	1.54	1.33–1.80	< 0.01	1.43	1.19–1.72	< 0.01
Richer	2.21	1.91–2.55	< 0.01	1.62	1.33–1.98	< 0.01

Characteristics	Health behavior about hepatitis B or C					
	Bivariate			Multivariate		
	OR	95% CI	p-value	AOR	95% CI	p-value
Richest	3.42	2.96–3.94	< 0.01	1.95	1.55–2.43	< 0.01
Exposure to mass media / Access to information						
No	1			1		
Yes	1.84	1.67–2.02	< 0.01	1.01	0.89–1.13	0.92
Healthcare decision-making / Autonomy						
No	1			1		
Yes	1.34	1.23–1.46	< 0.01	0.99	0.90–1.09	0.91
Accessibility to distant health facility for seeking medical services						
Big problem	1			1		
Not a big problem	1.57	1.44–1.71	< 0.01	0.99	0.90–1.10	0.98
Health insurance coverage						
No	1			1		
Yes	1.82	1.34–2.47	< 0.01	1.58	1.12–2.21	0.01

Table 4 shows that the geographical classification, husband's occupation, and the regions/provinces (except for Sindh) lose their significance in moving from bivariate to multivariable logistic regression models for overall knowledge about HBV and HCV. The findings indicate that, the older the women are, the better their overall knowledge is. This also applies to respondents' education, with a positive trend of knowledge associated with higher levels of education. However, this trend is not very obvious for husband's educational status, with up to 5 years of schooling and 6–10 years of schooling showing no significant differences compared to people with no formal schooling. Moreover, respondents belonging to the category of professional, clerical, sales & services (AOR = 1.48, 95% CI: 1.23–1.79) showed greater overall knowledge than those who were not working. Conversely, working in agriculture was negatively associated with knowledge (AOR = 0.72, 95% CI: 0.57–0.91). The results showed that the richest respondents were more likely to have high overall knowledge about HBV and HCV (AOR = 2.45, 95% CI: 1.97–3.04) than the poorest quintile. Moreover, the results indicate that respondents having healthcare autonomy (AOR = 1.22, 95% CI: 1.11–1.34) were more likely to have comprehensive knowledge about HBV and HCV.

The results presented in Table 5, related to factors associated with health behaviour, are generally comparable to the results for overall knowledge, showing that older respondents had better health behaviour than women aged 15–24 years. This refers particularly to the relevance of greater age, a higher level of education (this time also for husband's education), and wealth quintile. However, respondents' occupation only showed a significant difference for professions, clerical, sales & services (AOR = 1.29, 95% CI: 1.07–1.56) compared to the unemployed. Moreover, the results indicate that respondents with health insurance coverage (AOR = 1.58, 95% CI: 1.12–2.21) are more likely to display positive health behaviour related to HBV and HCV.

Discussion

This study set out to explore the relationship of sociodemographic characteristics and other variables with women's overall knowledge and health behaviour related to HBV and HCV. The findings highlight that the majority of women (88.3%) had heard about HBV and HCV. Nonetheless, only 34.8% had comprehensive knowledge about how to avoid HBV and HCV. With regard to women's awareness of various ways to avoid HBV and HCV, our study revealed that the majority of women knew that contaminated water and food, as well as use of infected syringes, are risk factors for HBV and HCV. Furthermore, some of the women were also aware of safe sex practices, safe blood transfusions and avoiding contact with infected persons to avoid HBV and HCV. Since the reported percentage of women's awareness is low, these findings highlight the importance of increasing awareness campaigns among the general public and to encourage people to go for testing in order to implement Pakistan's Government Plan to eliminate HBV and HCV by 2030 [2]. These findings are in line with previous research conducted in Ethiopia, which reported that the majority of women had never been screened for HBV [29]. The findings from a study in Ghana revealed that slightly fewer than half of the women surveyed reported knowledge about HBV [30]. Another small-scale study conducted in Pakistan reported that the majority of both men and women (75.4%) have poor knowledge regarding HBV and have never gone through HBV testing (96.9%) [6].

With reference to the association between women's overall knowledge and health behaviour regarding HBV and HCV and sociodemographic characteristics, the present study indicated that women living in urban areas, with higher age, better education, higher income and employed in the group of professional, clerical, sales & services reported better overall knowledge and health behaviour regarding HBV and HCV. These results are comparable with other studies carried out in Pakistan [11, 31], India [32], Uganda [33] and Poland [34]. Furthermore, these findings are also in line with the framework of social determinants of health, which emphasizes that an individual's socioeconomic position is (positively or negatively) associated with their knowledge and health behaviour [22].

In addition to sociodemographic factors, the findings of this study revealed that exposure to mass media and autonomy to make decisions about personal healthcare were positively associated with good health behaviour related to HBV and HCV. These findings are consistent with the results of previous studies conducted in Poland [34] and Pakistan [35], which highlighted women's autonomy and the positive effect

of the media on knowledge and awareness about disease prevention. Here, it is also important to note that the media has two important responsibilities in order to play its part in disease prevention. Firstly, it is responsible for creating awareness regarding the causes of disease, available treatments and measures to prevent the disease. Secondly, it is responsible for countering infodemics by avoiding misinformation regarding any health-related issue [36].

Summing up, the findings highlight the importance of obtaining accurate and comprehensive knowledge regarding the prevention and treatment of HBV and HCV. Regarding knowledge and awareness, it is important that reliable and valid knowledge is imparted to married women to bring about change in their attitudes and behaviour in relation to disease [37, 38]. It is evident from various studies that accurate and reliable knowledge helps to reduce myths and doubts associated with HBV and HCV [39–41]. Similarly, reliable sources may be used to disseminate information and knowledge regarding HBV. This information may help in shaping and moulding the attitudes and behaviour of individuals. Therefore, suitable and effective health education programmes and behaviour-change strategies at a community level should be launched in order to reduce misconceptions and help women to access services.

Limitations

Despite the strengths of this study, such as the large sample size and nationally representative data, one needs to consider several limitations when interpreting the data. A major limitation is the fact that the analysis is based on secondary data, which does not include all the items relevant to a holistic view on the determinants of knowledge and behaviour related to HBV and HCV. Furthermore, the assessment does not distinguish between HBV and HCV and combines these two diseases. Additionally, it is a cross-sectional design which does not allow for the investigation of causal relationships.

Conclusion

This study provides evidence that women's sociodemographic characteristics are associated with knowledge and behaviours relating to HBV and HCV. There is a need to create awareness about the causes and prevention of HBV and HCV among women residing in rural areas and having less education. In order to achieve the goal to eliminate HBV and HCV in Pakistan by 2030, the government needs to launch comprehensive media campaigns, particularly in rural areas, to provide adequate information about HBV and HCV regarding mode of transmission, symptoms of disease and awareness about available treatments and vaccines in order to inculcate favourable attitudes towards seeking treatment and to reduce the spread of infections.

Abbreviations

AOR: Adjusted odds ratio

CI: Confidence interval

HBV: Hepatitis B virus

HCV: Hepatitis C virus

GHSS: Global Health Sector Strategy

KAP: Knowledge, attitude, practice

OR: Odds ratio

PDHS: Pakistan Demographic and Health Survey

SPSS: Statistical Package for the Social Sciences

VIF: Variance inflation factor

WHO: World Health Organization

Declarations

Ethical Approval and Consent to Participate

The study is based on a secondary data analysis based on data from PDHS 2017–18, a publicly available dataset. Therefore, an ethical approval is not required. Respondents were informed about the ethics and right of voluntary participation. Written informed consent was obtained.

Consent for Publication

Not applicable.

Availability of Data and Materials

Data is publicly available from <https://dhsprogram.com/>.

Competing Interest

The authors declare that no competing interest exist. FF serves on the Editorial Board of BMC Public Health as Associate Editor.

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Authors Contributions

SM and RZ conceptualized the study. SM and SI analysed the data. RZ, MZZ, and FF supervised the work and supported in data analysis. SM drafted the draft, SI, RZ, MZZ, and FF revised it critically for important intellectual content. All authors approved the final manuscript.

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Figures

Figure 1

Awareness about various ways to avoid hepatitis B or C