Awareness about Hepatitis B and/or C Viruses among Residents of Adama and Assela Cities. Oromia Regional State, Oromia, Ethiopia

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Authors' contributions

This work was carried out in collaboration between both authors. Author BB designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Author FK managed the analyses of the study and literature searches. Both authors read and approved the final manuscript.

Original Research Article

ABSTRACT

Background: The word Hepatitis means an inflammation of the liver, and caused by one of many things, including a viral infection, bacterial infection, liver injury caused by a toxin (poison) or even an attack to the liver by the body's own immune system.
Objective: The study has been undertaken with the aim to assess the level of awareness of hepatitis B and/or C viruses and factors that may affect the awareness level among residents of Adama and Assela cities.
Methods: Two stages stratified random sampling technique with stratifications formed by sub city applied to this study. Classical Logistic Regression Model has been employed to predict the probability of awareness (dependent variable), on the base of a set of predictor variables.

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Results: Educational level, age, monthly income, total family size, reading habit and use of media had shown statistically significant association with response variable (awareness level) for both Adama and Assela cities. Only about 45.8% and 44.9% of the respondents at Adama and Assela cities respectively are aware of the infectious disease while the rest are not aware. Although 33.5% and 33.3% of the respondents on Adama and Assela cities respectively were aware of the availability of vaccine for Hepatitis B, only 6.6% and 6.8% of the respondents are vaccinated for Hepatitis B.

Conclusions: Variables significantly influencing awareness of residents at Adama and Assela cities towards Hepatitis B and/or C were educational level, monthly income, reading habit, uses of media.

1. INTRODUCTION

The liver is one of the body's powerhouses. It helps process nutrients and metabolizes medication. The liver also helps clear the body from toxic waste products. Although there are several forms of Hepatitis, the disease is usually caused by one of three viruses: Hepatitis A, Hepatitis B, and Hepatitis C Viruses. Both hepatitis B virus (HBV) and C virus (HCV) are spread mainly through contaminated blood and blood products, sexual contact and contaminated needles [1,2].

Viral hepatitis is a major health problem worldwide and causes acute and/or chronic hepatitis, which can lead to the development of extensive liver scarring (cirrhosis), liver failure, liver cancer and death [3,4]. HBV and HCV can be ended with the development of cirrhosis and liver cancer [5]. More than 500 million people worldwide are persistently infected with either of these two viruses thus presenting a major global health problem.

Both HBV and HCV are important occupational hazard for medical waste handlers and chronically infected HBV and HCV carriers are able to transmit through contact with their blood and body fluids, which includes occupational exposure to their blood and body secretions. The current treatment for hepatitis B virus infection is not curable after the infection progress to the chronic stage and very expensive for individuals in developing countries like Ethiopia. Thus, early screening of People who are at risk including medical waste handlers is mandatory [6].

Viral Hepatitis is an inflammation of the liver, most commonly caused by a viral infection. Malaise, joint aches, abdominal pain, vomiting 2-3 times per day for the first five days, defecation, loss of appetite, dark urine, fever, hepatomegaly (enlarged liver) and jaundice (citrus, yellowing of the eyes and skin) are some of the symptoms of hepatitis [7].

Awareness is the state or ability to perceive, to feel, or to be conscious of events, objects, or sensory patterns.

To prevent transmission and progression of the diseases in a given community, proper community awareness about the diseases is important. This study focus on the current level of awareness of respondents towards infectious diseases, Hepatitis B and/or C.

2. DATA AND METHODOLOGY

2.1 Study Design

A cross-sectional study was conducted into Adama and Assela towns among residents.

2.2 Sampling Design

Two stage stratified random sampling technique was used, which involves the division of a population into smaller groups, known as strata in such a way that individuals in the same strata are assumed to be homogenous with respect to some characteristics, and simple random sampling method (SRSM) would be adopted as an appropriate sampling design for selecting a representative sample of the strata.

2.3 Data Collection

Primary data was collected using a questionnaire.

2.4 Sample Size Determination

The appropriate sample size used for this study is obtained using the following formula [8]:

$$n = \frac{\sum_{i=1}^{k} \frac{N_i^2 \, P \, (1-P)}{W}}{\frac{N^2 \, d^2}{Z^2} + NP \, (1-P)}$$

(1)

Where:

N = the required total sample size
N = the total number of households (targeted residents)
Z = the inverse of the standard normal cumulative distribution that corresponds to the 5 percent level of confidence (Z=1.96)
K = the total number of kebeles (strata).
N_i = the number of households in each kebeles.
W_i = the estimated proportion of Ni to N (each kebels households to the total number of households)
P = the success probability
D = the level of precision (sampling error)

The desired sample size from the target population was 589 and 533 households for Adama and Assela cities respectively. With the additional assumption of 10 percent non response rate, the total sample size becomes 648 and 586 households for Adama and Assela cities respectively. Using proportional allocation, the sub-sample size from each kebele is given in Tables 1 and 2.

2.5 Variables Considered under the Study

The response variable in this study awareness categorized as aware and not aware. Explanatory Variables including Age (in year), Gender (Male, Female), marital status (Single, Not single), Religion (Orthodox, Catholic, Protestant, Muslim, Other), Accommodation (Alone, Not alone), Total family size in numbers (1-2, 3-4, >= 5), Participation in social forms, Reading Habit (Frequently, Sometimes, Rarely), Use of Media (Frequently, Sometimes, Rarely), Educational level (Elementary and less, High school, Higher education), Monthly income in Birr, Employment Status.

2.6 Method of Data Analysis

To meet the objective set up on this study binary logistic regression model and tests related are employed as a general methodology.

2.7 Classical Logistic Regression Model

Logistic regression is a statistical technique for predicting the probability of an event, given a set of predictor variables. It describes the relationship between a dichotomous response variable and a set of explanatory variables. The explanatory variables may be continuous or discrete.

Logistic regression can be used to predict the probability of the outcome of a response variable on the basis of continuous and/or categorical explanatory variables and to determine the magnitude of the effect of the explanatory variables on the response variable; to rank the relative importance of explanatory variables; to assess interaction effects; and to understand the impact of covariate control variables. The impact of predictor variables is usually explained in terms of odds ratios.

Table 1. Sample size by kebele (For Adama City)

S.N	Kebels	Total Number of households in each kebeles (N_i)	W_i	n_i
1	01	5358	0.17	105
2	03	5554	0.18	107
3	04	6506	0.21	126
4	06	1873	0.06	37
5	08	2800	0.09	54
6	13	3210	0.11	58
7	14	5419	0.18	102
Total		30,720	1	589
Required total sample size				589

Table 2. Sample size by kebele (For Assela City)

S.N	Kebels	Total Number of households in each kebeles (N_i)	W_i	n_i
1	01	1307	0.27	145
2	02	1711	0.36	186
3	03	1807	0.37	202
Total		4825	1	533
Required total sample size				533

2.8 Model Description

$$P\left(Y_i = 1/X_i\right) = P_i = \frac{\exp^{\left(\beta_0 + \beta_1 x_{i1} + ,... + \beta_p x_{ip}\right)}}{1 + \exp^{\left(\beta_0 + \beta_1 X_{i1} + ... + \beta_p x_{ip}\right)}} \qquad (2)$$

Where $P\left(Y_i = 1/X_i\right)$ is the probability that the respondent i is aware given set of predictors X and $\beta_0, \ldots, \beta_k$ are the vector of unknown coefficients.

The Wald test

The statistic is defined as:

$$Z^2 = \left(\frac{\hat{\beta}_j}{SE\left(\hat{\beta}_j\right)}\right)^2 \rightarrow \chi_1^2, \text{ where } \quad j = 1,2, \quad ... \quad , k \qquad (3)$$

3. RESULTS OF THE STUDY

The analysis has been performed for 648 individuals from Adama city and 586 individuals from Assela city.

3.1 Descriptive Statistics Results

The major source of information regarding Hepatitis, Hepatitis B and Hepatitis C was a pamphlet, flyer, posters and magazines (21.6% and 21.3%) followed by radio (17.3% and 17.2%).

Out of 648 and 586 participants in Adama and Assela cities respectively, 82.4% and 81.7% heard about Hepatitis and 48.0% and 46.4% heard about Hepatitis B and C respectively.

About 33.6% and 33.3% of the respondents in Adama and Assela cities respectively knew that nausea, jaundice, vomiting, joint pain and abdominal pain are symptoms of Hepatitis B and/or C.

3.2 Analysis of Binary Logistic Regression

The result of omnibus tests of the model coefficients had a chi-square value of 295.949 for Adama city and 312.519 for Assela city at 19 degrees of freedom for both cities, which was significant at the level of significance, α= 0.05. This indicates that the independent variables predict the dependent variable, awareness of residents at Adama and Assela cities towards Hepatitis B and/or C, well and the model was a good fit.

Table 3. Summary of 648 for Adama city and 586 for Assela city respondents' sources of information regarding Hepatitis B and/or C

Source of information	Frequency		Prevalence	
	Adama	Assela	Adama	Assela
Radio	112	101	17.3	17.2
TV	104	92	16.0	15.7
Pamphlets ,flyers ,magazines …	140	125	21.6	21.3
from individuals	105	94	16.2	16
Other	78	69	12.0	11.8

Table 4. Summary of 648 for Adama city and 586 for Assela city respondents' awareness regarding hepatitis B and/or hepatitis C

Questions	Category	Frequency		Prevalence	
		Adama	Assela	Adama	Assela
Have you ever heard about Hepatitis or "yewefbesheta"?	No	114	107	17.6	18.3
	Yes	534	479	82.4	81.7
Have you ever heard about Hepatitis B or C virus?	No	337	314	52.0	53.6
	Yes	311	272	48.0	46.4
IsHepatitis viral disease	No	214	197	33.0	33.6
	Yes	326	286	50.3	48.8
Can Hepatitis B and C affect any age group?	No	76	65	11.7	11.1
	Yes	237	209	36.6	35.7
Are loss of appetite and dark urine the common symptoms of hepatitis B & C	No	111	95	17.1	16.2
	Yes	202	179	31.2	30.5
Are nausea, jaundice, vomiting, joint pain common symptoms of Hepatitis B or C?	No	95	79	14.7	13.5
	Yes	218	195	33.6	33.3
Do you think it is possible to be infected by Hepatitis B or C and show no symptoms	No	125	108	19.3	18.4
	Yes	188	166	29.0	28.3
Can Hepatitis B and C be transmitted by close personal contact?	No	182	117	20.1	20
	Yes	130	156	28.1	26.6
Can Hepatitis B and C be transmitted by unsterilized syringes, needles and surgical instrument?	No	71	58	11.0	9.9
	Yes	242	216	37.3	36.9
Can Hepatitis B and C transmitted by contaminated blood?	No	73	67	11.3	11.4
	Yes	240	207	37.0	35.3
Can Hepatitis B and C be transmitted by means blades of barber/ear and nose piercing?	No	177	156	27.3	26.6
	Yes	136	118	21.0	20.1
Can Hepatitis B and C be transmitted by unsafe sex?	No	153	131	23.6	22.4
	Yes	160	143	24.7	24.4
Can Hepatitis B and C be transmitted from mother to child during delivery?	No	148	127	22.8	21.7
	Yes	165	147	25.5	25.1
Are Hepatitis B and C curable/treatable?	No	65	53	10.0	9
	Yes	248	221	38.3	37.7
Can Hepatitis B and C self-cured by body own immune system?	No	251	54	9.6	9.2
	Yes	62	220	38.7	37.5
Do you share use of blades, tooth brusshes, tweezers, or razors?	No	303	267	46.8	45.6
	Yes	8	5	1.2	9
Are you aware that vaccination is available for Hepatitis B?	No	94	77	14.5	13.1
	Yes	217	195	33.5	33.3
Are you aware that there is no vaccination for Hepatitis C?	No	160	137	24.7	23.4
	Yes	150	134	23.1	22.9
Whom do you think shoud get Hepatitis B vacinated?	Adult & child	58	48	9.0	8.2
	All at any stage	251	224	38.7	38.2

In this study, Cox and Snell R-square indicate that 36.7 % and 41.3% of the variation in response variable, awareness of residents at Adama and Assela cities towards Hepatitis B and/or C, explained by its predictor variables in both cities respectively. Negelkerke R-square in the model summary Table 7 is 49.0% for Adama and 55.3% for Assela city, indicating there is a relationship of 49.0% and 55.3% between the predictors and the dependent variable for Adama and Assela cities respectively. That is, 49.0% of the variation in response variable in Adama city is explained by the explanatory variable and 55.3% of variation in response

Table 5. Summary of vaccination and testing experience of Adama and Assela cities respondents

Questions	Category	Frequency		Prevalence	
		Adama	Assela	Adama	Assela
Have you ever been vaccinated against Hepatitis B?	No	212	187	32.7	31.9
	Yes	43	40	6.6	6.8
	Not Remember	51	40	7.9	6.8
Have you ever been tested for Hepatitis B or C?	No	194	164	29.9	28
	Yes	97	91	15.0	15.5
	Not Remember	15	12	2.3	2
If Yes, the reason for testing	General heath check	10	10	1.5	1.7
	Feeling sick	79	73	12.2	12.5
	Pregnancy	2	2	0.3	0.3
	By chance	5	5	0.8	0.9
What do you recommend if you or someone is infected by Hepatitis B or C?	Go to a health institution	297	261	45.8	44.5
	Go to a traditional healer	13	10	2.0	1.7

Table 6. Omnibus tests of model coefficients for Adama and Assela cities

	Chi-square		df		Sig.	
	Adama	Assela	Adama	Assela	Adama	Assela
Step	295.949	312.519	19	19	.000	.000
Block	295.949	312.519	19	19	.000	.000
Model	295.949	312.519	19	19	.000	.000

Table 7. Model Summary for Adama and Assela cities

Step	-2 Log likelihood		Cox & Snell R Square		Nagelkerke R Square	
	Adama	Assela	Adama	Assela	Adama	Assela
1	597.864	493.695	.367	.413	.490	.553

variable in Assela city is explained by the explanatory variable.

We demonstrate that only five predictor variables were selected by the model, that is educational level, monthly income, total family size, reading habit and use of media. All the variables selected by the model have a significant effect on the outcome variable.

The results indicate that, for instance, odds of awareness for respondents with high school level of education increased by the factor 1.151 as compared with respondents with elementary and less level of education. The value 0.141 shows an increase in log odds of respondents with high school educational level. The value 0.973 indicates an increase in log odds of respondents with higher educational level; the odds ratio $e^{0.973}$= 2.646 means that the odds of awareness increases by a factor 2.646 for respondents with higher educational level compared to the reference category.

From Table 9, we demonstrate six predictors' variables that have a significant effect on the response variable. Those are age, educational level, monthly income, total family size, reading habit and use of media.

The results indicate that, for instance, Odds ratio of age group obtained in Table 9 using the reference category of age group 18-30. The value -0.296 shows a decrease in log odds of age group 31-40; the odds ratio $e^{-0.296}$= 0.744 means that the odds of awareness decrease by a factor 0.744 for respondents with age group 31-40 compared to the reference category.

4. DISCUSSION

The study has tried to assess awareness of residents of Adama and Assela cities towards Hepatitis B and/or C.

Table 8. Variables in the final logistic regression equation for Adama city

	B	S.E	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Age			3.526	3	.317			
Ag(1)	-.188	.250	.566	1	.452	.828	.507	1.353
Ag(2)	.375	.303	1.533	1	.216	1.456	.803	2.637
Ag(3)	.215	.535	.161	1	.688	1.240	.434	3.540
Gender(1)	-.251	.216	1.350	1	.245	.778	.509	1.188
Educational level			11.254	2	.004*			
Edu lv(1)	.141	.263	.288	1	.592	1.151	.688	1.928
Edu lv(2)	.973	.314	9.576	1	.002	2.646	1.429	4.900
Employment status			2.118	2	.347			
Empl (1)	-.339	.478	.504	1	.478	.712	.279	1.818
Empl (2)	.078	.490	.026	1	.873	1.082	.414	2.826
Monthly income			7.444	3	.049*			
Montly income(1)	.728	.408	3.178	1	.035	2.070	.930	4.608
Montly income(2)	.919	.438	4.408	1	.036	2.508	1.063	5.917
Montly income(3)	1.305	.486	7.194	1	.007	3.686	1.421	9.562
Marital status(1)	.038	.255	.022	1	.883	1.038	.630	1.712
Accommodation (1)	.466	.292	2.535	1	.111	1.593	.898	2.825
Total family size			6.077	2	.048*			
Total f(1)	.458	.309	2.202	1	.138	1.581	.863	2.894
Total f(2)	.797	.327	5.934	1	.015	2.219	1.169	4.215
Reading habit			35.971	2	.000*			
Read(1)	-.679	.239	8.083	1	.004	.507	.317	.810
Read(2)	-2.145	.358	35.968	1	.000	.117	.058	.236
Use of media			25.805	2	.000*			
Use media (1)	-1.040	.225	21.291	1	.000	.353	.227	.550
Use media (2)	-1.204	.379	10.077	1	.002	.300	.143	.631
Constant	-.448	.447	1.006	1	.316	.639		

Table 9. Variables in the final logistic regression equation for Assela city

	B	S.E.	Wald	df	Sig.	Exp(B)	95%C.I.for EXP(B)	
							Lower	Upper
Age			8.350	3	.039*			
Ag (1)	-.296	.284	1.083	1	.298	.744	.426	1.299
Ag (2)	.624	.337	3.428	1	.064	1.866	.964	3.611
Ag (3)	.706	.631	1.252	1	.263	2.026	.588	6.982
Gender (1)	-.219	.242	.820	1	.365	.803	.500	1.290
Educational level			13.894	2	.001*			
Edu lv (1)	.368	.297	1.540	1	.215	1.446	.808	2.587
Edu lv (2)	1.252	.347	12.990	1	.000	3.498	1.770	6.911
Employment status			3.704	2	.157			
Empl (1)	-.817	.545	2.249	1	.134	.442	.152	1.285
Empl (2)	-.276	.550	.251	1	.617	.759	.258	2.233
Monthly income			6.988	3	.042*			
Montly income(1)	.902	.463	3.795	1	.051	2.464	.995	6.103
Montly income(2)	1.066	.492	4.685	1	.030	2.903	1.106	7.618
Montly income(3)	1.411	.542	6.786	1	.009	4.102	1.418	11.860
Marital status (1)	.234	.286	.668	1	.414	1.264	.721	2.215
Accommodation (1)	.248	.328	.571	1	.450	1.282	.673	2.439
Total family size			3.304	2	.049*			
Total f (1)	.457	.345	1.748	1	.042	1.579	.802	3.108
Total f (2)	.657	.361	3.303	1	.039	1.929	.950	3.917
Read habit			37.754	2	.000*			

	B	S.E.	Wald	df	Sig.	Exp(B)	95%C.I.for EXP(B)	
							Lower	Upper
Read (1)	-.931	.263	12.544	1	.000	.394	.235	.660
Read (2)	-2.46	.403	37.286	1	.000	.086	.039	.188
Use of media			22.322	2	.000*			
Use media (1)	-.999	.248	16.284	1	.000	.368	.227	.598
Use media (2)	-1.48	.451	10.842	1	.001	.227	.094	.549
Constant	-.139	.511	.074	1	.786	.871		

Awareness about the disease and vaccination among the respondents were 45.8% and 6.6% for Adama city residents and 44.9% and 6.8% for Assela city residents respectively. Educated individuals were more aware of the availability of vaccine for Hepatitis B virus. Those individuals who read newspaper, magazines, pamphlet, and follows mass media frequently were more aware of Hepatitis B and/or C and its vaccination. Some of these findings were in line with other study done in Coastal eastern India [9]. Educational level and uses of media had shown statistically significant variables in this study, and this finding is comparable with the results of the study done in Coastal eastern India.

This study revealed a significant defect of awareness of Hepatitis B and/or C in most aspects. Although the majority of the participants knew that HBV and/or HCV is a liver disease, and many of them had been screened for HB, they had a poor understanding of vaccination, screening, their own HBV and/or HCV status, modes of HBV and/or HCV transmission, and the consequences and treatment of HBV and/or HCV. The finding of this study were in line with other study done on "Knowledge, Awareness, and Prevention of Hepatitis B Virus Infection Among Korean American Parents" [10].

The classical logistic regression results revelaed that the variables significantly influencing awareness of residents at Adama and Assela cities towards Hepatitis B and/or C were educational level, monthly income, reading habit, uses of media and age is obtained as a significant variable at Assela city.

5. CONCLUSIONS AND IMPLICATIONS OF THE STUDY

Awareness campaigns should be enhanced to increases the knowledge of the public on Hepatitis B and/or C infections with emphasis on its mode of transition and measures to reduce the risk of controlling the viruses (practicing safe sex and avoiding of sharing infection needles, toothbrushes, or shaving razors). The public should be aware of the potential risk when getting used of blades of barber/ body piercing in a place where adequate disinfection procedures might not be available or practiced. The most effective means of preventing Hepatitis B infection is through vaccination, thus educational interventions are needed to promote Hepatitis B and/or C screening and increase vaccination coverage. It is important to develop educational strategies, seminars and public talks with special attention to the person of lower educational levels, since they may not be aware of the importance of Hepatitis B and C screening and vaccination.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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