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Assessment of knowledge, attitudes and practice regarding hepatitis B infection among health care workers

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ABSTRACT

Background: Hepatitis B infection is a potentially severe liver infection caused by the hepatitis B virus and is a significant global health issue. The likelihood of health care professionals contracting hepatitis B is high. Vaccination is the most effective and feasible method for avoiding hepatitis B virus infection. Hepatitis B virus (HBV) prevention requires adequate knowledge, attitudes, and practices regarding hepatitis B infection and immunization. **Aim of work:** To study the level of knowledge, attitudes, and practice towards HBV infection among health care workers in Suez Canal University Hospital. **Materials and methods:** A descriptive cross-sectional study was conducted on 305 health care employees at Suez Canal University Hospital, including physicians and nurses. A self-administered questionnaire with sociodemographic, knowledge, attitude, and practice-related questions was established. **Results:** Among the 305 HCWs of the study, 55.5% have adequate understanding of HBV transmission, even though 80% of health care workers (HCWs) were vaccinated against HBV, only 7.5% had immunity test after immunization. About 50% of physicians and 38.7% of nurses sustained 2 to 5 needle stick / sharp injury incidents during their working careers. Nearly, 16.2% of physicians and 19.0% of nurses reported using post-exposure prophylaxis, including hepatitis B vaccination. **Conclusion:** The majority of HCWs at Suez Canal University Hospital have proper knowledge, attitudes, and practices regarding HBV transmission and immunization. The health care authorities should provide training courses on hepatitis B infection and vaccination for HCWs to reduce the risks of acquiring hepatitis B virus infection.

Introduction

Hepatitis B infection is a serious global public health concern since two billion people worldwide have positive serology for past or current HBV infection, according to the World Health Organization (WHO) [1], WHO estimates that 296 million people were living with chronic hepatitis B

infection in 2019, with 1.5 million new infections each year. In 2019, hepatitis B resulted in an estimated 820 000 deaths, mostly from cirrhosis and hepatocellular carcinoma (primary liver cancer) [2]. Injection drug use, sexual contact with an infected person, or the transmission of the virus from an infected mother to her newborn are the most

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prevalent routes of hepatitis B transmission. Chronically infected persons are typically the primary source of HBV transmission [3].

Health care workers (HCWs) should pay special attention to HBV infection because it is the most common cause of hepatitis contracted at work, due to their frequent exposure to patients' body fluids. Worldwide, percutaneous injuries are the leading cause of HBV transmission among medical professionals. Egyptian HCWs are at high risk of contracting hepatitis B virus (HBV), with a prevalence of 1.5%, due to needle stick injuries and exposure to infected blood and body fluids [4]. In a study of interns at Zagazig University Hospitals, only 60% of healthcare professionals were complying with the hepatitis B immunization schedule [5].

Protecting against hepatitis B virus infection with vaccination is the most practical and efficient approach. The HBV vaccination has been available since 1982; it has a protective efficacy of 90-95% and is generally safe. Each dosage of the HBV vaccine is given intramuscularly at 0, 1, and 6-month intervals. All healthcare workers, but especially those at high risk for contracting HBV, should get vaccinated against hepatitis B, as recommended by the World Health Organization (WHO) [6]. Post - exposure prophylaxis should be given after any significant contact with a patient's body fluids. However, the WHO reports that vaccination rates for HBV among HCWs in developing nations range from 18% to 39%, whereas these rates are between 67% and 79% in developed nations [4].

Knowledge, positive attitudes, and good prevention practices (KAP) are the keys to successfully preventing hepatitis B infection [7]. Training programs and other relevant socio-demographic factors are linked with variation in the rates of HBV prevention-related knowledge and behavior. These links have been determined using Wan's knowledge-attitude-practice-outcome (KAP-O) framework [8]. Literature shows that there is a lack of research on KAP for hepatitis B infection prevention worldwide, especially in Africa [9]. The purpose of this research is to assess healthcare workers' KAP regarding HBV infection and immunization at Suez Canal University Hospital.

Aim of work

To study the level of knowledge, attitudes, and practice towards HBV infection among health

care workers (HCWs) in Suez Canal University Hospital.

Materials and methods

This cross-sectional descriptive study was conducted according to the international guidelines of Strengthening the Reporting for Observational Studies in Epidemiology; STROBE (R): STROBE checklist, version 4. Bern: Institute of Social and Preventive Medicine University of Bern; 2007. This study followed the principles of the Helsinki Declaration (This is crucial ethical consideration for medical research work).

There were 305 healthcare workers (nurses and physicians) included randomly in this cross-sectional study where done in Suez canal university hospital in the period between January and July 2019. Sample size was 305 healthcare workers calculated according to the following equation [10]. Where: n = sample size, $Z_{\alpha/2} = 1.96$ (The critical value that divides the central 95% of the Z distribution from the 5% in the tail), p = the prevalence of good knowledge regarding hepatitis B among nurses = 14% [11]. **Arafa et al.** E = the margin of error (=width of confidence interval) =5%. All participants in the study have completed the questionnaire.

Study methods

Data was collected through a modified self-administrated questionnaire [12].

The questionnaire was initially designed in English and translated into Arabic by experts in infectious diseases and biostatistics to match with the local colloquial Arabic terminology used by physicians and health educators in the community. After translation and back translation (13), the questionnaire was pilot tested on 15 HCWs (5 doctors and 10 nurses) who are not included among the study participants to determine acceptability and the clarity of the questions, and to confirm its face validity; it was then modified accordingly. The questionnaire included 4 sections: demographics data (age, gender, occupation,...), knowledge (about prevention of HBV infection, and about protection against hepatitis B) attitude toward hepatitis B vaccine, and practice tests questions. The attitude questions were designed as Likert scale. There are 2 versions of the questionnaire (Arabic for nurses and English for doctors).

Good knowledge: if the respondents were able to answer 70 % or more of knowledge items correctly.

Poor knowledge: if the respondents answered less than 70 % of knowledge items. Positive attitude: if the respondents were able to give the correct answer for 70 % or more of attitude items. Negative attitude: if the respondents answered less than 70 % of attitude items. Good practice: when the study participants were at least able to answer 70% or more practice items correctly. Malpractice: when the participants were unable to answer 70 % of practice items correctly. The following operational definitions were used in this study according to previous study [7].

Consent

Permission to conduct the study was requested from the Dean of the faculty and head of the Suez Canal University Hospital. Verbal consent was taken from participating HCWs prior to data collection.

Ethical approval

The protocol was submitted for ethical clearance to the Research Ethics Committee of the faculty of Medicine, Suez Canal University (4241, 27/7/2020). The collected data was treated confidentially and will not be used for any purpose other than the present study.

Statistical analysis

Data was collected, coded, and entered the statistical software program. As required, data was presented in tables and graphs. The significance level considered was 0.05. All analyses were conducted using version 22.0 of the SPSS for windows statistical package.

Results

The studied group included 43.9% males and 56.1% females with a mean age of 35 years, 36.4% were physicians and 56.1% nurses. Most of healthcare workers (79.7%) worked in government hospitals, 15.7% in private hospitals, 3% in clinics, and 1.6% in general practices (**Table 1**).

As shown in **figure (1)**, the highest percent of good knowledge among HCWs was about the fact that "one can get hepatitis B through a needle stick injury" (83.9%). While only 36.1% of HCWs knew that "Hepatitis B vaccine protects against HBV for at least 15 years."

As shown in **table (2)**, The highest level of knowledge among HCWs (83.9%) was regarding the fact that "one can acquire hepatitis B through a needle stick injury." While the least was 36.1% of HCWs were aware that hepatitis B vaccine provides at least 15 years of protection against HBV. The overall percentage of knowledgeable HCWs in the present survey was 55.5%.

Table 3 showed that there was a statistically significant difference between both studied groups as regards all the questions asked except for full vaccination (3 doses).

Table 4 showed that there was a no statistically significant difference between both studied groups as regards all the questions asked except for two questions: HBV vaccination should be compulsory for all HCWs, and i do not trust vaccinations.

Table 1. Demographic data of the studied health care workers (No = 305).

Demographic information	No.	%
Age / years (Mean± SD, range)	29.2±5.6	18-54
Gender		
Males	134	43.9
Females	171	56.1
Occupation		
Physicians	111	36.4
Nurses	194	63.6
Working institute		
Governmental hospital	243	79.7
Private hospital	48	15.7
Clinics	9	3.0
General practice	5	1.6

Table 2. Knowledge about protection against hepatitis B among HCWs (No=305).

Knowledge about protection against hepatitis B	True	False	Don't know
One can get hepatitis B through a needle stick injury	256(83.9%)	46(15.1%)	3(1.0%)
There is no effective vaccine for hepatitis B	67(22.0%)	219(71.8%)	19(6.2%)
After vaccination for hepatitis B, there is no need for a blood test to confirm immunity against hepatitis B	78(25.6%)	176(57.7%)	51(16.7%)
Hepatitis B vaccine provides 100% protection for 90% of adults and children	161(52.8%)	66(21.6%)	78(25.6%)
Hepatitis B vaccine protects against HBV for at least 15 years	110(36.1%)	91(29.8%)	104(34.1%)
Patients who are vaccinated against hepatitis B should not be considered as a possible source of hepatitis B	144(47.2%)	128(42.0%)	33(10.8%)
A person who has been vaccinated or recovered from previous hepatitis B infection, can infect others	115(37.7%)	148(48.5%)	42(13.8%)
HIV is more infectious than hepatitis B virus	121(39.7%)	159(52.1%)	25(8.2%)
In order to be protected against hepatitis B, one needs a titre of at least 10mIU/ml of antibodies against hepatitis B	129(42.3%)	21(6.9%)	155(50.8%)

Table 3. Health care workers practices of protection against HBV (No =305).

Practices of protection against hepatitis B	Physicians (111)		Nurses (194)		Total (305)		p value
	Yes	No	Yes	No	Yes	No	
Vaccination against Hepatitis B virus	99(89.2%)	12(10.8%)	145(74.4%)	49(25.6%)	244(80.0%)	61(20%)	0.006*¥
Full vaccination (3 doses)	80(80.8%)	31(19.2%)	109(75.2%)	85(24.8%)	189(62.0%)	116(38%)	0.381¥
Immunity against hepatitis B checked after vaccination	17(17.2%)	94(82.8%)	6(4.1%)	188(95.9%)	23(7.5%)	282(92.5%)	0.001*¥
Immunity against Hepatitis B vaccine according to immunity check (immune)	17(17.2%)	94(82.8%)	2(1.0%)	192(99%)	19(6.2%)	286(93.8%)	<0.0*¥
Needle stick / sharp injury during working lifetime	101(91%)	10(9.0%)	153(78.9%)	41(21.1%)	254 (83.3%)	51(16.7%)	0.011*¥
Taking postexposure prophylaxis including Hepatitis B vaccine	18(16.2%)	93(83.8%)	37(19.1%)	157(80.9%)	55(18.0%)	250(82%)	<0.001*¥
Blood / body fluid splashes in eyes	68(61.3%)	43(38.7%)	78 (40.2%)	116(59.8%)	146(47.9%)	159(52.1%)	<0.001*§
Wearing protective clothing when handling blood or body fluids	100(90.1%)	11(9.9%)	182 (93.8%)	12(6.2%)	282(92.5%)	23(7.5%)	0.024*¥

¥ :Chi square test

§ :Fisher's Exact test,

*: Statistically significant

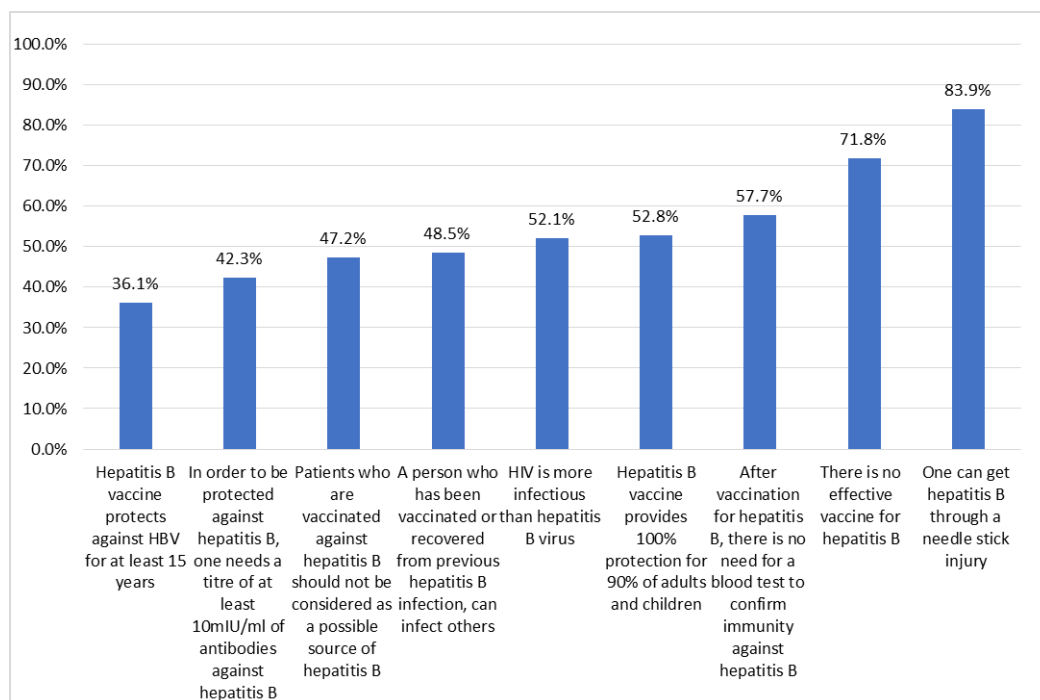
Table 4. Attitude of health care workers (HCWs) towards hepatitis B vaccination (No=305).

Attitude towards hepatitis B vaccination	Physicians (111)		Nurses (194)		Total (305)		p value
	Agree / Neutral	Disagree	Agree / Neutral	Disagree	Agree / Neutral	Disagree	
Hepatitis B vaccination should be compulsory for HCWs	111(100.0%)	0(0.0%)	184(94.8%)	10(5.2%)	295(96.7%)	10(3.3%)	0.016*§
Hepatitis B vaccination is too expensive	72(64.9%)	39(35.1%)	119(61.3%)	75(38.7%)	191(62.6%)	114(37.4%)	0.540¥
I am scared of being vaccinated because it hurts	27(24.3%)	84(75.7%)	37(19.1%)	157(80.9%)	64(21.0%)	241(79.0%)	0.278¥
I am not at risk for hepatitis B because I am always careful when examining patients and taking specimens	33(29.7%)	78(70.3%)	61(31.4%)	133(68.6%)	94(30.8%)	211(69.2%)	0.755¥
I do not trust vaccinations	9(8.1%)	102(91.9%)	34(17.5%)	160(82.5%)	43(14.1%)	262(85.9%)	0.023*¥
Vaccination is against my religion / traditional beliefs	6(5.4%)	105(94.6%)	16(8.2%)	178(91.8%)	22(7.2%)	283(92.8%)	0.356¥

§: Fisher's Exact test,

¥: Chi square test,

*: Statistically significant

Figure 1. Percent of true knowledge among HCW about prevention of HBV infection (n=305).

Discussion

The WHO estimates that two billion people worldwide test positive for past or current HBV infection. Hepatitis B virus infection is a global health problem [1]. Knowledge of HBV infection and proper immunization may help to lower the infection rates, so this study aims to assess HCWs' knowledge, attitudes and practices regarding HBV infection and immunization at Suez Canal University Hospital in Ismailia, Egypt.

Out of the 305 HCWs shared in the current study, (63.6%) were nurses and (36.4%) were physicians (**Table 1**), 134 (43.9%) were males and 171(56.1%) were females which is different from the study carried out in Cameroon, where 35.3% of HCWs were nurses, but the specialists and the general practitioners were 3.9% only, in the same study most of the HCWs were females 180 (64.3%) while a minority were males 100 (35.7%) [14]. About 80% of the studied HCWs were from Governmental hospitals. In a study performed in Asser region, El Bahrain; 71.9% of HCWs were working in public hospital [15].

The overall percentage of knowledgeable HCWs in the present survey was 55.5% (poor knowledge). About 73% of the HCWs in Gondar Hospital, Ethiopia, have a good knowledge of HBV transmission, progress, and its vaccination [16]. The variation in the HCWs knowledge may be attributed to the training courses which they received, and the infection control measures applied in each hospital.

About 80% of the studied HCWs were HBV-vaccinated (**Table 3**). In developing nations, the prevalence of HBV vaccination among HCWs was found to be low. A Kenyan study found that only 12.8% of HCWs were vaccinated [17], unlike a study conducted in the Gauteng province of South Africa that found that the HBV vaccination coverage was 79.3% [18]. The higher results in the present study can be attributed to the policies and regulations for the prevention of occupationally acquired nosocomial transmission of HBV in our hospitals, which include making the vaccination available to medical students and newly hired HCWs.

Nearly 62% of the studied HCWs were fully vaccinated (receiving three doses) (**Table 3**). This rate of completion of vaccination doses; although it was not high; was attributed to good attitude of HCWs in Suez Canal University Hospital. We found that an HCWs positive attitude

toward hepatitis B infection prevention (perceived susceptibility, perceived severity, and perceived threat) can have a direct impact on the HCWs performance of good practice in hepatitis B infection prevention, this finding agreed with that detected in the Kingdom of Saudi Arabia [19]. A good attitude toward HBV infection is crucial because, according to the KAP-O framework, attitude can combine with knowledge to form the practice of hepatitis B infection prevention [8].

Compared to a previous study conducted in Ethiopia, only 12.9% of HCWs were fully vaccinated [1]. Also, 38 (16.4%) out of 232 HCWs in the Bosaso, Somalia was fully vaccinated [20]. The current results were consistent with those from other high-income countries as China (60%) [6]. The study's context, sample size, HCWs specialty, regulations, and economic variables all play a role in explaining the substantial observed variation.

Taking post-exposure prophylaxis including Hepatitis B vaccine was reported by 16.2% of physicians and 19.1% of nurses (p value <0.001), only 7.5% of HCWs (17.2% of physicians and 4.1% of nurses) performed an immunization check ($p = 0.001$) (**Table 3**). In an Iranian study, 56.8% of surgeons were screened for anti-HB level after vaccination [21], while in a Saudi Arabian study, 56.2% of vaccinated healthcare workers undergo antibody testing after vaccination [22]. A study conducted in Kenya revealed that none of the vaccinated HCWs were tested for anti-HB levels following vaccination [17]. The low rate of post-vaccination testing among the studied group was due to that post-immunization screening is not required like the vaccination schedule, and healthcare workers (HCWs) believe that they are protected as long as they receive the vaccine; therefore, we recommend routine post-immunization testing, particularly for HCWs who are at high risk of exposure.

Limitations of the study

Several limitations exist in this study: Since vaccination status was self-reported and not obtained from vaccination records, recall bias would occur, resulting in either an overestimation or an underestimation of HBV vaccination coverage. Only physicians and nurses were included in the study; laboratory technicians and cleaning technicians were not included.

Conclusion and recommendations

In general, the knowledge, attitude, and practice of HCWs regarding HBV infection and vaccination at the Suez Canal university Hospital was satisfactory, with significant gaps that require strengthening, particularly among non-vaccinated ones. The health care authorities should provide training courses on hepatitis B infection and vaccination for HCWs so that they can reduce the risks to which they are exposed due to the nature of their work. They should also develop a national hepatitis B vaccination policy that includes a management plan, and regular periodic medical examinations for older HCWs; newly hired HCWs; and medical and nursing students.

Conflict of interest

The authors declared any conflict of interest.

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References

- 1-**Abebaw TA, Aderaw Z, Gebremichael B.** Hepatitis B virus vaccination status and associated factors among health care workers in Shashemene Zonal Town, Shashemene, Ethiopia: a cross sectional study. *BMC research notes* 2017;10(1):1-9.
- 2-**World Health Organization (WHO).** Hepatitis B, available at: <https://www.who.int/news-room/fact-sheets/detail/hepatitis-b>.
- 3-**Auta A, Adewuyi EO, Kureh GT, Onoviran N, Adeloje D.** Hepatitis B vaccination coverage among health-care workers in Africa: a systematic review and meta-analysis. *Vaccine* 2018;36(32):4851-60.
- 4-**Elmaghloub R, Elbahrawy A, Didamony GE, Elwassief A, Saied Mohammad AG, Alashker A, et al.** Hepatitis B virus genotype E infection among Egyptian health care workers. *Journal of translational internal medicine* 2017;5(2):100-5.
- 5-**El-Sokkary RH, Tash RM, Mortada EM, El Seifi OS.** Evaluation of a hepatitis B virus protection intervention among interns at Zagazig University Hospitals, Egypt. *Infection, Disease & Health* 2020;25(1):50-9.
- 6-**Yuan Q, Wang F, Zheng H, Zhang G, Miao N, Sun X, et al.** Hepatitis B vaccination coverage among health care workers in China. *PloS one* 2019;14(5):e0216598.
- 7-**Abdela A, Woldu B, Haile K, Mathewos B, Deressa T.** Assessment of knowledge, attitudes and practices toward prevention of hepatitis B virus infection among students of medicine and health sciences in Northwest Ethiopia. *BMC research notes* 2016;9(1):1-7.
- 8-**Wan TT, Rav-Marathe K, Marathe S.** A systematic review of KAP-O framework for diabetes. *Medical Research Archives* 2016;3(9).
- 9-**Gebremeskel T, Beshah T, Tesfaye M, Beletew B, Mengesha A, Getie A.** Assessment of knowledge and practice on hepatitis B infection prevention and associated factors among health science students in Woldia University, Northeast Ethiopia. *Advances in preventive medicine* 2020;2020.
- 10-**Naing NN.** Determination of sample size. *The Malaysian journal of medical sciences: MJMS* 2003;10(2):84.
- 11-**Arafa AE, Mohamed AA, Anwar MM.** Nurses' knowledge and practice of blood-borne pathogens and infection control measures in selected Beni-Suef hospitals Egypt. *Journal of the Egyptian Public Health Association* 2016;9 1(3):120-6.
- 12-**Africa PN.** Knowledge, attitudes and practices of health care workers regarding hepatitis B vaccination, in the Ekurhuleni

Metro, Gauteng Province (thesis, Masters of Public Health) University of Limpopo (Medunsa Campus) 2010:p62-71 139

- 13-Process of translation and adaptation of instruments.** Geneva: World Health Organization; 2018 (http://www.who.int/substance_abuse/research_tools/translation/en/)
- 14-Ngum AM, Laure SJ, Tchetya X, Tambe TA, Ngwayu CN, Wirsiy FS, et al.** Vaccination against Hepatitis B among health care workers in the Bamenda Health District: influence of knowledge and attitudes, Cameroon. *Pan African Medical Journal* 2021;40(1).
- 15-Basharat V, Alshahrani AA, Haifa'Hisham AA, Alshahrani RS, Alahmari MB.** Knowledge, Attitude and Practice of Health Workers Concerning the Occupational Risks of Hepatitis B Virus in Asser Region. *Bahrain Medical Bulletin* 2022;44(2).
- 16-Ayalew MB, Horssa BA, Getachew N, Amare S, Getnet A.** Knowledge and attitude of health care professionals regarding hepatitis B virus infection and its vaccination, University of Gondar Hospital, Ethiopia. *Hepatic medicine: evidence and research* 2016:135-42.
- 17-Suckling RM, Taegtmeier M, Nguku PM, Al-Abri SS, Kibaru J, Chakaya JM, et al.** Susceptibility of healthcare workers in Kenya to hepatitis B: new strategies for facilitating vaccination uptake. *Journal of Hospital Infection* 2006;64(3):271-7.
- 18-Razwiedani LL, Mogale NM, Mawela MP.** Hepatitis B vaccination coverage amongst healthcare workers in a tertiary academic hospital in Gauteng province, South Africa. *Southern African Journal of Infectious Diseases* 2022;37(1):393.
- 19-Zaeri AY, Zaihi ZN, AbuDyab FA, Othman EE, Somily EH.** Knowledge, attitude and practice among Jazan university students in health sciences colleges regarding Hepatitis B virus and its vaccine. *The Egyptian journal of hospital medicine* 2018;73(6):6959-66.
- 20-Hussein NA, Ismail AM, Jama SS.** Assessment of hepatitis B vaccination status and associated factors among healthcare workers in Bosaso, Puntland, Somalia 2020. *BioMed Research International* 2022;2022.
- 21-Moghimi M, Marashi SA, Kabir A, Taghipour HR, Faghihi-Kashani AH, Ghoddoosi I, et al.** Knowledge, attitude, and practice of Iranian surgeons about blood-borne diseases. *Journal of Surgical Research* 2009;151(1):80-4.
- 22-Paul T, Maktabi A, Almas K, Saeed S.** Hepatitis B awareness and attitudes amongst dental health care workers in Riyadh, Saudi Arabia. *TROPICAL DENTAL JOURNAL* 1999:9-12.