

Knowledge and attitude of health care professionals regarding hepatitis B virus infection and its vaccination, University of Gondar Hospital, Ethiopia

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Background: Hepatitis B is a global public health problem affecting approximately 10% of the world population. Health care professionals (HCPs) are at an increased risk of acquiring hepatitis B infection due to occupational exposure. Having enough knowledge and proper attitudes toward the infection and its vaccination is crucial in preventing the infection. This study aimed to assess knowledge of and attitudes toward hepatitis B virus (HBV) infection as well as its vaccination among HCPs working in University of Gondar Hospital.

Methods: An institution-based cross-sectional study design was employed from April 1 to May 1, 2016 on 297 HCPs working at University of Gondar Hospital. A self-administered questionnaire prepared in the English language was used to collect the data. The questionnaire contained sociodemographic characteristics, knowledge, and attitude-related questions. Data were entered and analyzed using SPSS software version 20.1. Descriptive statistics, cross-tabs, and binary logistic regression were utilized. $P < 0.05$ was used to declare association.

Results: From a total of 297 HCPs participated in the study 73.1% have good knowledge of HBV transmission, progress, and its vaccination. The majority (91.3%) of the respondents believe that their job puts them at risk of HBV infection. The majority of study participants (94%) believe vaccination is necessary. Medical doctors have 8.4 times better knowledge of HBV and its vaccination than other professionals (adjusted odds ratio = 8.399, CI = 1.536–45.936).

Conclusion: The majority of HCPs working in University of Gondar Hospital have good knowledge of HBV transmission, progress, and its vaccination. The majority of HCPs believe that their job puts them at greater risk for HBV and vaccination is necessary. Knowledge of the HCPs significantly varies across professions.

Keywords: hepatitis B virus, knowledge, attitude, occupational exposure, health care professional

Introduction

Hepatitis B virus (HBV) is a very important public health problem affecting approximately 10% of the world population. According to a 2009 World Health Organization report, approximately 2 billion people were affected with HBV worldwide, >350 million suffered from chronic lifelong infection, and more than 1 million individuals die because of cirrhosis and liver cancer every year.^{1–3} There is high prevalence of HBV infection among Blacks.² It is also a major public health problem in Ethiopia.^{4–8}

Health care professionals (HCPs) are at increased risk of acquiring hepatitis B infection due to occupational exposure.^{1,3,9} In one study, HCPs were shown to have up

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to a fourfold increased risk of acquiring HBV infection.¹⁰ The main risk factor to contract HBV infection for HCPs is direct contact with infectious material, especially HBV-infected blood or via a needle stick injury with HBV-contaminated body fluids. In particular, recapping of hollow-bore needles appears to increase the risk of needle stick injuries. An increased risk of occupational exposure affects the safety and well-being of HCPs as well as the quality of care delivered by them. HCPs in high-risk areas of hospital settings are potentially at an increased risk of experiencing substantial anxiety and depression. Hence, occupational exposure not only leads to acquiring infectious pathogens but also affect the mental health of HCPs.¹¹ Moreover, hospital workers have low participation in vaccination, and this is especially harmful for those whose work exposes them to the risk of HBV infection.²

Another study has reported a lack of awareness of HBV among HCPs; consequently, proper precautions against blood-borne infections are lacking by these workers.¹² HCPs should familiarize themselves with “universal precautions”, which is defined by the Center for Disease Control as an asset of precautions designed to prevent transmission of blood-borne pathogens when providing first aid or health care. Under universal precautions, blood and certain body fluids of all patients are considered potentially infectious for blood-borne pathogens such as HBV.¹³

A safe and effective vaccine against HBV has been available for approximately 20 years and is effective in preventing infection and further serious consequences of hepatitis, including liver cancer and cirrhosis, when given before or after exposure.³ It has generally been described as having an excellent safety record and is effective, with a protective efficiency of 90%–95%. In fully vaccinated subjects, the vaccine will provide long-term protection from HBV infection, possibly even lifelong protection.¹⁴ Moreover, after exposure to blood or bodily fluids, postexposure prophylaxis can be administered as a combination of passive immunization with hepatitis B immunoglobulin and a vaccination with hepatitis B vaccine. However, the most cost-effective method to prevent and control hepatitis B is through preexposure vaccination and compliance of standard precautions.¹

Having enough knowledge and proper attitudes toward the infection is crucial in preventing its occupational exposures. But the knowledge, attitude, and practices relating to HBV infection and its vaccination vary among HCPs. Studies have shown that the overall knowledge, attitude, and practice of HCPs about HBV infection and its vaccination is inadequate.^{15,16} Prevention of any disease is proportional

to knowledge, attitude, and practice of the population and reflection of the importance that is paid to health-related issue by the society.¹³

Studies conducted to assess the knowledge and attitude of HBV and its vaccination among HCPs in Ethiopia are very rare. This study was therefore conducted to determine the level of knowledge and attitude of HBV infection and its vaccination among HCPs working in an Ethiopian teaching hospital (University of Gondar Hospital) and to identify factors affecting their knowledge of HBV infection and its vaccination.

Methods

Study area and period

The study was conducted at University of Gondar Hospital, Gondar, Ethiopia. It is 738 km away from the capital city of Ethiopia, Addis Ababa. The hospital has >400 beds and provides service in various departments including pediatrics, surgery, gynecology, psychiatry, dermatology, dentistry, ophthalmology, pharmacy, medical laboratory, and others. In the hospital, there are 943 health care workers (HCWs). The study was conducted from April 1 to May 1, 2016.

Study design and subjects

Institution-based cross-sectional study design was used to assess knowledge and attitude of HBV and its vaccination among HCPs in University of Gondar Hospital. HCPs that were not available at the workplace during the study period and those who did not want to volunteer to participate in the study were excluded. A total of 297 HCPs were included in the study. Simple random sampling technique was used to recruit study participants.

Data collection and management

Data were collected using a data collection format developed by the research authors after reviewing literature. The format consisted of sociodemographic characteristics, history of exposure to HBV, and questions that measure knowledge and attitude of HCPs on HBV infection and its vaccination. The data collection tool was pretested on 5% of the sample population in order to check for any inconsistencies. Necessary adjustments were made accordingly before the study began. Data were collected using a structured self-administered questionnaire prepared in the English language. The data collection was done by three graduating pharmacy students after 1 day training was given. The completeness, consistency, and accuracy of the data were checked every day by the principal investigator.

Data analysis

The collected data were processed and analyzed using SPSS version 20.1 (IBM Corporation, Armonk, NY, USA). Descriptive statistics were calculated for the study variables and frequency distribution tables were used to describe the findings. Association between dependent and independent variables were analyzed using binary logistic regression and crude and adjusted odds ratios were calculated. $P < 0.05$ was used to declare association.

Ethical consideration

This study was approved by the Ethical Review Committee of School of Pharmacy, University of Gondar. An official letter of permission was taken from the Ethical Review Committee and given to the administrative office of the hospital. Permission was taken from the responsible authorities of the hospital. The respondents were informed about the purpose of the study, and written informed consent was obtained from the study participants. Confidentiality of the information taken was assured, thus name and address of the HCWs were not recorded in the data collection format.

Operational definition

Good knowledge – those who answered >60% of knowledge questions correctly.

Poor knowledge – those who answered <60% of knowledge questions correctly.

Positive attitude – given for interviewee who answered at least 60% of attitude question positively.

Negative attitude – given for interviewee who answered <60% of attitude question positively.

Results

Sociodemographic characteristics of study subjects

A total of 297 HCPs participated in this study. As shown in Table 1, the majority (63.6%) were male. The age range of participants was 21–58 years with the mean age of 26.91 ± 4.65 years. According to their professional characteristics, majority were nurses (98 [33%]) and medical doctors (93 [31.3%]). Most study subjects (84.2%) were first-degree holders. Three-fourths of participants (75.1%) had <5 years of work experience.

Health care professionals' knowledge on HBV infection and its vaccination

Approximately three-fourths (73.1%) of the participants have good knowledge on HBV transmission, progress, and its vaccination. The major sources of information about

Table 1 Sociodemographic and occupational characteristics of HCPs, University of Gondar Hospital, Gondar, Ethiopia, 2016

Variable	Category	Frequency (%)
Age group (years)	21–29	246 (82.8)
	30–39	42 (14.1)
	>40	9 (3)
Sex	Male	189 (63.6)
	Female	108 (36.4)
Marital status	Single	198 (66.7)
	Married	99 (33.3)
Religion	Orthodox	230 (77.4)
	Muslim	28 (9.4)
	Protestant	30 (10.1)
	Others ^a	9 (3.0)
Profession	Medical doctor	93 (31.3)
	Nurse	98 (33)
	Pharmacist	36 (12.1)
	Lab technologist	26 (8.8)
	Midwives	21 (7.1)
	Health officer	7 (2.3)
	Others ^b	16 (6.0)
Educational level	Certificate	6 (2.0)
	Diploma	9 (3.4)
	First degree	250 (84.2)
	Master degree	23 (7.7)
	Specialist	9 (3)
	Others ^c	26 (8.8)
Department of work	Surgery	36 (12.1)
	Laboratory	28 (9.4)
	Delivery unit	30 (10.1)
	Emergency department	15 (5.1)
	Internal medicine department	76 (25.6)
	Pediatrics	57 (19.2)
	Pharmacy unit	16 (5.4)
	Gynecology and obstetrics	13 (4.4)
	Others ^c	26 (8.8)
Work experience (years)	<5	223 (75.1)
	≥5	74 (24.9)

Notes: ^aCatholic, atheist, and Hindu; ^bhealth officer, anesthesia, dentist, physiotherapies, psychiatry nurse; ^cdental department, oncology, optometry, psychiatry ward, recovery, general ward.

Abbreviation: HCPs, health care professionals.

HBV were formal education (83.5%), followed by training (30.6%) and internet (17.2%). As shown in Table 2, the majority of the HCPs (92.9%) knew that the virus can be transmitted by infected blood. However, only 72 (24.2%) of them knew that urine is noninfectious. Approximately one-fifth (21.5%) of the study subjects did not know the number of doses of the vaccine required for complete protection of HBV.

Attitude of HCPs toward HBV infection and its vaccination

As indicated in Table 3, almost all (94.6%) of the respondents agreed or strongly agreed that HBV infection is a major public health problem. Respondents' attitude on whether their

Table 2 Knowledge of HCPs on HBV transmission, progress, and vaccination in University of Gondar Hospital, Gondar, Ethiopia, 2016

Question type	Questions	Frequency, yes (%)
Questions related to HBV transmission and prognosis	Can you get HBV infection through percutaneous injury?	195 (65.7)
	Can you get HBV infection through mucous membrane contact with blood?	223 (75.1)
	Is blood infectious body fluid?	276 (92.9)
	Is vaginal fluid infectious body fluid?	263 (88.5)
	Is amniotic fluid infectious body fluid?	262 (88.2)
	Is urine infectious body fluid?	225 (75.8)
	Is hepatitis curable disease?	92 (31.0)
	Does HBV cause liver cancer?	229 (77.1)
Questions related to HBV vaccination	How many doses of HBV vaccine required for complete protection?	
	1 dose	3 (1.01)
	2 doses	12 (4.04)
	3 doses	233 (78.5)
	6 doses	2 (0.67)
	I do not know	47 (15.82)
	What is the expected interval between the first dose and the next dose?	
	1 month	174 (58.58)
	2 months	15 (5.05)
	3 months	35 (11.78)
	6 months	17 (5.72)
	I do not know	56 (18.8)
	What is expected interval between the last dose and the dose preceding?	
	1 month	34 (11.44)
	2 months	16 (5.38)
	3 months	35 (11.78)
	6 months	130 (43.77)
	I do not know	82 (27.60)
	If the vaccine is taken after exposure does it reduce the likelihood of being positive for HBV?	101 (34)
	Should immunity status be checked (anti HBsAg serologic testing be done) after completing the vaccine series?	149 (50.2)
	If the immunity test result is negative does the vaccine series need to be repeated?	130 (43.7)

Abbreviations: HBV, hepatitis B virus; HBsAg, hepatitis B surface antigen; HCPs, health care professionals.

Table 3 Attitude of HCPs toward HBV infection and its vaccination, University of Gondar Hospital, Gondar, Ethiopia, 2016

S no	Statements	Strongly agree, n (%)	Agree, n (%)	Neutral, n (%)	Disagree, n (%)	Strongly disagree, n (%)
1	Hepatitis is serious public health problem	205 (68.3)	79 (26.3)	10 (3.3)	2 (0.7)	1 (0.3)
2	Your job puts you at greater risk of HBV infection	217 (72.3)	57 (19.0)	13 (4.3)	7 (2.3)	3 (1)
3	It is necessary for you to receive hepatitis B vaccine	234 (78.0)	50 (16)	4 (1.3)	4 (1.3)	4 (1.3)
4	Hepatitis B vaccine is safe	127 (42.3)	100 (33.3)	63 (21.0)	6 (2.0)	1 (0.3)
5	After exposure to contagious fluid/material, the vaccine reduces likelihood of being HBV positive	71 (23.7)	93 (31.0)	51 (17.3)	59 (19.7)	23 (7.7)
6	HBV positive HCPs should not be involved in exposure prone invasive procedures	67 (22.3)	86 (28.7)	68 (22.7)	58 (19.3)	18 (6.0)
7	The vaccine is not important if the exposure is not with patient blood of known HBV positive	32 (10.7)	47 (15.7)	39 (13.0)	103 (34.3)	76 (25.3)
8	There should be the vaccine guideline in work areas	133 (44.3)	124 (41.3)	13 (4.3)	12 (4.0)	15 (5.0)
9	Training of the vaccine is important for a behavioral change	160 (53.3)	109 (36.3)	16 (5.3)	7 (2.3)	5 (1.7)

Abbreviations: HBV, hepatitis B virus; HCPs, health care professionals.

job puts them at greater risk of HBV infection seems to favor a positive response (strongly agree and agree) (91.3%). The majority (94%) of HCPs believe that it is necessary for them to receive a hepatitis B vaccine.

Approximately half of HCPs (49.2%) reported that they were exposed to risky conditions for HBV infection. The likely options for being exposed were listed in the survey instruments, and the respondents frequently picked being

busy (69 [47.3%]) and rushing at work (66 [45.2%]). As indicated in Table 4, the most frequently taken measure after an incidence of exposure were washing with soap, water, and antiseptic (48.6%).

Factors affecting the knowledge of HCPs on HBV infection and its vaccination

A multivariate binary logistic regression analysis showed that only the type of profession has significant association with knowledge of respondents on HBV and its vaccination. As shown in Table 5, medical doctors have 8.4 times better knowledge on HBV and its vaccination than other professionals (adjusted odds ratio =8.399, CI =1.536–45.936).

Discussion

HBV infection is a serious global public health problem. It occurs all over the world.^{1,2} Hepatitis B prevalence is the highest in sub-Saharan Africa and East Asia.¹⁷ Studies conducted among different segments of the population in Ethiopia also showed that HBV is a major public health problem in the country.^{7,17–19} Numerous studies have shown that HCPs are at higher risk of acquiring HBV than the general population.^{4,6,20,21} It has been estimated that approximately 6,200 HBV infections occur each year among HCPs in Sub-Saharan African.^{9,22} A good knowledge of HBV virus and modes of infection as well as adequate vaccination may reduce infection rate.² This study aimed to assess the knowledge and attitude of HCPs on HBV infection and its vaccination in University of Gondar Hospital, Ethiopia.

In this study, approximately three-fourths (73.1%) of participants had a good knowledge on HBV transmission, progress, and its vaccination. A survey conducted in Kuwait revealed that knowledge of the various aspects of HBV was

generally high.²³ In a study conducted at Bahir Dar, Ethiopia, more than half (52%) of the respondents were knowledgeable about hepatitis B infection, and 62% of HCWs were knowledgeable about the hepatitis B vaccine.¹ In contrast to our finding, the knowledge of HBV is generally low among the populace in a study carried out among Turkish community in the Netherlands.²⁴ This may be because HCPs have better access to health-related information than non health care professionals.

The majority of the participants (92.9%) knew that the virus can be transmitted by infected blood. Approximately 88% of the study subjects knew that vaginal and amniotic fluids can transmit the virus. Similarly, studies carried out among HCPs in Sudan and Morocco revealed that most had a good knowledge of blood as a medium of infection.^{25,26} According to a study done among operating room personnel in Nigeria, the majority of HCPs had a good knowledge on the risk factors for HBV infection. More than 80% of them believed that HBV infection can be transmitted through percutaneous injury, mucous membrane contact with blood, and contact of abraded skin with potentially infected tissue.²⁷ In a cross-sectional study carried out in four public hospitals in Wad Meden, Sudan, a good respondents' knowledge about HBV transmission was observed. A study conducted in Addis Ababa, Ethiopia also showed that HCPs' knowledge regarding occupational transmission of HBV was good (Gashu, unpublished data, 2015).

Almost all (94.6%) of the respondents agreed or strongly agreed that HBV infection is a great public health problem. Respondents' attitude on whether their job puts them at greater risk of HBV infection seems to favor positive response (strongly agree and agree) (91.3%). The majority of the study participants (94%) believe vaccination is necessary. A survey conducted in Kuwait revealed a similar finding indicating 80.5% of respondents believed that their job put them at risk of HBV infection, and 86.3% considered that it was necessary to receive the vaccine.²³ In the study conducted at Bahir Dar, Ethiopia, 64.7% of respondents perceived their risk of acquiring hepatitis B infection was high or very high.¹

Approximately half (49.2%) of study participants have been exposed to risky conditions for HBV infection. The most frequently picked likely options for being exposed were being busy (47.3%) and rushing at work (45.2%). The study conducted in Addis Ababa, Ethiopia also indicated being busy as the primary contributory factor for exposure. The most frequently taken measures after the incidence of the exposure were washing with soap, water, and antiseptic (48.6%). The Center for Disease Control recommends all

Table 4 Reasons for being exposed to potentially infectious situation and measures taken afterward among HCPs, University of Gondar referral and teaching hospital, Gondar, Ethiopia, 2016

Variables	Frequency (%)
Factors contribute to HBV exposure, N=146	
Lack of infection prevention supplies	54 (32.9)
Being busy	69 (47.3)
Rushing at work	66 (45.2)
Careless handling of the patient or infectious material	34 (23.3)
Postexposure preventive measures, N=146	
Immediately reporting	22 (15.1)
Know about patient disease	50 (34.2)
Allow injury to bleed	3 (2.1)
Wash with soap, water, and antiseptic	71 (48.6)

Note: The total percentage may excide 100 because participants may choose more than one alternative.

Abbreviations: HBV, hepatitis B virus; HCPs, health care professionals.

Table 5 Determinants of knowledge status about HBV infection and its vaccination among HCPs working in University of Gondar Hospital, Gondar, Ethiopia, 2016

Variable	Category	Knowledge status		COR (95%)	AOR (95%)
		Good, n (%)	Poor, n (%)		
Age group (years)	20–29	181 (83.4)	65 (81.2)	1.392 (0.338–5.729)	1.565 (0.260–9.324)
	30–39	30 (13.8)	12 (15.0)	1.250 (0.268–5.826)	2.007 (0.316–12.744)
	>40	6 (2.8)	3 (3.8)	1.000	1.000
Sex	Male	144 (66.4)	45 (56.2)	1.534 (0.909–2.591)	0.946 (0.469–1.909)
	Female	73 (33.6)	35 (43.8)	1	1.000
Marital status	Unmarried	159 (73.3)	39 (48.8)	2.882 (0.694–4.904)	2.634 (0.265–5.487)
	Married	58 (26.7)	41 (51.2)	1.000	1.000
Religion	Orthodox	169 (77.9)	61 (76.2)	2.216 (0.576–8.524)	2.289 (0.417–12.556)
	Muslim	16 (7.4)	12 (15.0)	1.067 (0.235–4.843)	1.617 (0.244–10.728)
	Protestant	27 (12.4)	3 (3.8)	7.200 (0.220–42.492)	6.096 (0.719–51.670)
	Others	5 (2.3)	4 (5.0)	1.000	1.000
Profession	Medical doctor	86 (39.6)	7 (8.8)	9.556 (2.731–133.440)	8.399 (1.536–45.936)
	Nurse	66 (30.4)	32 (40.0)	1.604 (0.548–4.696)	2.546 (0.574–11.301)
	Health officer	6 (2.8)	1 (1.2)	4.667 (0.451–48.257)	4.370 (0.310–61.695)
	Pharmacist	19 (8.8)	17 (21.1)	0.869 (1.266–2.843)	1.843 (0.323–10.499)
	Laboratory technologist	20 (9.2)	6 (7.5)	2.593 (0.676–9.947)	23.429 (0.664–827.226)
	Midwives	11 (5.1)	10 (12.5)	0.856 (0.231–3.162)	0.928 (0.152–5.663)
	Others	9 (4.1)	7 (8.8)	1.000	1.000
Education level	Certificate	5 (2.3)	1 (1.2)	0.625 (0.0311–12.410)	0.574 (0.013–26.230)
	Diploma	3 (1.4)	6 (7.5)	0.063 (0.005–0.760)	0.072 (0.002–2.103)
	First degree	183 (84.3)	67 (83.3)	0.341 (0.042–2.781)	0.337 (0.017–6.577)
	Master's degree	18 (8.3)	5 (6.2)	0.450 (0.045–4.501)	0.337 (0.017–6.577)
	Specialist	8 (3.7)	1 (1.2)	1.000	1.000
Department of working	Surgery	30 (13.8)	6 (7.5)	3.667 (1.136–11.838)	1.979 (0.457–8.569)
	Laboratory	21 (9.7)	7 (8.8)	2.200 (0.692–6.992)	0.212 (0.008–5.431)
	Delivery unit	23 (10.6)	7 (8.8)	2.410 (0.763–7.605)	3.841 (0.769–19.174)
	Emergency department	8 (3.7)	7 (8.8)	0.838 (0.233–3.009)	0.657 (0.128–3.390)
	Internal medicine	57 (26.3)	19 (23.8)	2.200 (0.863–5.606)	0.990 (0.286–3.424)
	Pediatrics	45 (20.7)	12 (15.0)	2.750 (1.006–7.516)	1.007 (0.262–3.878)
	Pharmacy unit	9 (4.1)	7 (8.8)	0.943 (0.268–3.315)	1.196 (0.211–6.767)
	Gynecology and obstetrics	9 (4.1)	4 (5.0)	1.650 (0.402–6.769)	0.936 (0.151–5.790)
	Others	15 (6.9)	11 (13.8)	1.000	1.000
Work experience (years)	<5	165 (76.0)	58 (72.5)	1.204 (0.673–2.153)	0.721 (0.316–1.642)
	>5	52 (24.0)	22 (27.5)	1.000	1.000
Attend training	Yes	154 (71.0)	36 (45.0)	2.988 (1.760–5.071)	1.786 (0.903–3.535)
	No	63 (29.0)	44 (55.0)	1.000	1.000

Abbreviations: HBV, hepatitis B virus; HCPs, health care professionals; COR, crude odds ratio; AOR, adjusted odds ratio.

HCPs to immediately make a report after encountering an injury. But according to our finding, immediate reporting after exposure to risky conditions for HBV infection was practiced only in 7.3% of the respondents.

In this study, 77.7% of the study subjects correctly answered the number of doses of the vaccine required for complete protection of HBV. A closer result was found in the study conducted at Addis Ababa, Ethiopia (Gashu, unpublished data, 2015). Accordingly, 75.2% of the study subjects correctly answered the number of doses of the vaccine required for complete protection of HBV infection.

In this study, only the type of profession was found to have a significant association with the knowledge status of HCPs on HBV and its vaccination. Similarly, the study

conducted in Addis Ababa showed that the type of profession has significant association with the knowledge status of HCPs on HBV and its vaccination. A study conducted in Nigeria also indicated that there was no significant association between good knowledge of HBV infection and any sociodemographic variables.⁹

Since half of HCPs believed that they have been exposed to risky conditions, hospital administrators and policy makers need to consider expanding the currently available prevention facilities and put in place sustainable infection control and prevention strategies. Training HCWs on safe handling and proper disposal of potentially infectious fluids and devices is important to reduce occupational hepatitis B transmission. As the knowledge level of HCPs is not sufficient (73.1%), it

would be very helpful if awareness creation activities such as disseminating important information on HBV infection and its vaccination were done.

Conclusion

HCPs working in University of Gondar Hospital have a good knowledge on HBV transmission, progress, and its vaccination. The majority of HCPs believe that their job puts them at a greater risk for HBV and a vaccination is necessary. The main reasons for HCPs being exposed to were being busy and rushing at work. HCPs' knowledge significantly varies across professions.

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Disclosure

The authors report no conflicts of interest in this work.

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