Original Article

Knowledge and Satisfaction with Hand Hygiene Practices among Healthcare Workers in Emergency and Intensive Care Units of a Tertiary Hospital in Nigeria

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ABSTRACT

Background: Hand hygiene is regarded as one of the most important and cheapest ways of preventing healthcare associated infections (HCAIs). Due to increasing incidence and effect of HCAIs, interest in hand hygiene is increasing among the managers of healthcare in various facilities globally. This study aimed at evaluating the level of knowledge and satisfaction with hand hygiene practices among Healthcare workers in emergency and intensive care units of a tertiary hospital In Nigeria.

Methodology: A cross-sectional study was conducted using simple random sampling to select HCWs in the emergency and intensive care units of a tertiary healthcare facility. Data collection was done with self-administered structured questionnaires. The data obtained were analyzed with SPSS version 22.

Results: Overall, 80 HCW were recruited. This study shows that majority of the staff had between moderate to good knowledge on hand hygiene. However, the overall correct responses regarding appropriate use of hand rub and hand washing was unsatisfactory and there were several gaps in staff knowledge with regard to the accurate procedure. More than two-third of the respondents (72.5%) revealed lack of training programme on hand hygiene by the hospital infection control unit and the management.

Conclusion: The study shows the need for further improvement of the existing hand hygiene training programme to address the gaps in knowledge and also the need to upgrade hand hygiene facilities in our healthcare institution.

Keywords: Hand hygiene, Health Care Associated Infections, Knowledge, Satisfaction, Emergency and Intensive Care Units

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INTRODUCTION

Hand hygiene is regarded as one of the most important ways of preventing healthcare associated infections.[1] Due to increasing incidence and effect of HCAIs coupled with emergence of multidrug resistant organisms (MDROs) and associated complications, interest in hand hygiene, which is the single most important measure in controlling HCAIs, is increasing among the managers of healthcare in various facilities globally.[2-4] There is a lot of scientific evidence to support the observation that if properly implemented, hand hygiene alone can significantly reduce the risk of cross-transmission of infection in healthcare settings.[5-7]

Health Care-Associated Infection (HCAIs) can be described as "an infection not present or incubating at the time the patient presented to the healthcare facility but manifests 48 hours or more after initial patient care or within 30 days after having received healthcare. This includes infections acquired in the hospital, but appearing after discharge, and also occupational infections among staff of the facility".8 Despite the fact that effective hand hygiene can lower the prevalence of healthcare associated infections, sadly the prevalence of these infections continue to rise and poses challenges to patient care and healthcare providers. Healthcare associated infections due to poor hand hygiene has been linked to an unacceptably high level of morbidity, mortality and healthcare costs.[9] The World Health Organization (WHO) has reported prevalence of HCAIs in developing countries to be as high as 19%, affecting 1.4million patients at any time globally. The burden of HCAIs is greatly increased, causing additional morbidity and mortality in Intensive Care Units (ICUs) with MDROs as the most common pathogens thereby posing serious challenge to patient management.[10,11]

Studies have shown that compliance with hand hygiene among healthcare workers, Paramedics and medical students/nurses is generally low.12, 13 Further increase in compliance is difficult to sustain, although the World Health Organization (WHO) has compiled guidelines in this regard in order to reduce the prevalence of health care associated infections.[14-16] Furthermore, many studies done to assess the knowledge and reasons for non-adherence to hand hygiene guidelines have found that compliance with hand hygiene protocols by health care workers (HCWs) is poor due to several constraints, such as heavy work load, high number of clinical procedures and skin conditions of the HCWs.[17-19] It is worthy of note that non-compliance to hand hygiene protocols or guidelines was higher before performing emergency procedures due to increase workload and lack of motivation as documented in other study.[20-22] The emergency and intensive care units of our facility is one of the busiest arms of the hospital with high turnover rate of patients and health care workers and therefore, a very high-risk area for the spread of health care related infections if proper hand hygiene protocols and procedures are not adhered to. It is on this background that this study aimed at assessing the knowledge and satisfaction of hand hygiene maintenance among the HCWs. It is anticipated that the outcome of this study will assist the hospital management and the infection control unit of the hospital to put in place appropriate measures for successful implementations of its hand washing policy.

METHODOLOGY

This was a cross-sectional study on knowledge of hand hygiene and satisfaction with the facilities available for hand hygiene among staff of the emergency and intensive care units of a tertiary healthcare facility in Northwest Nigeria over a period of 8 weeks (October – November 2019). The facility is a 650 bedded hospital that also houses accident and emergency units (a surgical, medical and Paediatrics accident and emergency units) along with a surgical, medical, and neonatal intensive care unit (ICU). The staff members included the consultants, medical officers/house officers and residents on training, nursing staff, paramedical technicians and health care assistants. Ethical approval (ABUTH/HREC/W17/2019) was obtained from the Health Research and Ethics Committee of the facility. A written informed consent was obtained from each respondent who met the inclusion criteria before enrolment into the study.

A simple random sampling technique was employed to pick eighty (80) healthcare workers in A& E and ICU that satisfied the inclusion criteria. The knowledge of HCW was assessed using the adapted WHO questionnaire for Health-Care Workers revised in August 2009.14 The questionnaire has five sections namely on: demographic information, assessment of knowledge, attitudes, practices and facilities available for hand hygiene. Knowledge was assessed using 8 questions which included

multiple-choice questions with single answers as well as true or false answers. Overall Knowledge and Satisfaction with facilities was assessed for each individual using a scoring system.1 for correct knowledge and satisfaction, 0 for incorrect knowledge and dissatisfaction with the availability of facilities for hand hygiene. The mean score for each category was used for calculating the percentage for that section; A percentage of 75% and above for knowledge and satisfaction with the facilities available was considered as good, 50% - 74% for knowledge and satisfaction of facilities was considered as moderate while less than 50% was considered as poor.

Data analysis and management was done using statistical package for social sciences (SPSS) software version 22. Chi square/Fisher's exact statistical tests were applied and data was presented in tables. For the descriptive aspects of analysis, frequency distribution was generated for all categorical variables. P-value less than 0.05 was considered statistically significant.

RESULTS

Of the 80 respondents majority, 37(46.3%) were within age group 20-29years while only 4 (%%) were between 50-60 years of age. The male to female ratio was 1.3:1. There was equal percentage of respondents (41.3%) who had less than 2 years of experience and those who had more than 5 years of experience. Medical doctors constituted majority, 35(43.8%) of the respondents. Table 1.

A little above half of all the respondents 43 (53.8%) had good knowledge while only 12 (15%) had good attitude. Only 2 (2.5%) respondents had poor practice of hand hygiene. Majority, 34 (42.5%) of the respondents expressed only moderate satisfaction with the hygiene facilities provided. Of those who expressed poor satisfaction in facilities provided, most of them were from the medical emergency unit. Table 2.

Tables 3.1, 3.2, 3.3 and 3.4 show the questions posed to the respondents on their knowledge of hand hygiene.

Table 1: Socio-demographic Characteristics of the Respondents

VARIABLES	EMERGENCY AND INTENSIVE CARE UNITS				TOTAL (n=80)
	Surgical Emergency (n=20)	Medical Emergency (n=24)	NICU (n=22)	Paediatrics Emergency (n=14)	
Age					
20 – 29 years	6(7.5%)	10(12.5%)	8(10.0%)	13(16.3%)	37(46.3%)
30 – 39 years	8(10.0%)	12(15.0%)	9(11.3%)	0(0.0%)	29(36.3%)
40 – 49 years	4(5.0%)	2(2.5%)	3(3.8%)	1(1.3%)	10(12.5%)
50 – 60 years	2(2.5%)	0(0.0%)	2(2.5%)	0(0.0%)	4(5.0%)
Gender					
Female	8(10.0%)	5(6.3%)	16(20.0%)	6(7.5%)	35(43.8%)
Male	12(15.0%)	19(23.8%)	6(7.5%)	8(10.0%)	45(56.3%)
Yrs of experience					
Less than 2 yrs	4(5.0%)	9(11.3%)	14(17.5%)	6(7.5%)	33(41.3%)
2-5yrs	4(5.0%)	5(6.3%)	0(0.0%)	5(6.3%)	14(17.4%)
More than 5 yrs	12(15.0%)	10(12.5%)	8(10.0%)	3(3.8%)	33(41.3%)
Profession					
Doctor	9(11.3%)	12(15.0%)	12(15.0%)	2(2.5%)	35(43.8%)
Nurse	4(5.0%)	10(12.5%)	6(7.5%)	2(2.5%)	22(27.5%)
Paramedical tech.	5(6.3%)	2(2.5%)	0(0.0)	0(0.0)	7(8.8%)
Health care assist	2(2.5%)	0(0.0)	0(0.0)	0(0.0)	2(2.5%)
Medical Students	0(0.0)	0(0.0)	0(0.0)	10(12.5%)	10(12.5%)
Nursing students	0(0.0)	0(0.0)	4(5.0%)	0(0.0)	4(5.0%)

NICU = Neonatal Intensive Care Unit; Paramedical tech. = Paramedical technicians; Health care assists = Health Care Assistance

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Table 2: Hand Hygiene KAP and Satisfaction Scores Across Emergency/ICUs

Variable	Emergency and Intensive Care Unit					
	Surgical Emergency	Medical Emergency	NICU	Paediatrics Emergency	Total	Statistic
Knowledge						
Moderate	10 (12.5%)	13(16.3%)	7(8.8%)	7(8.8%)	37(46.2%)	X^2 =2.641
Good	10(12.5%)	11(13.8%)	15(18.8%)	7(8.8%)	43(53.8%)	P=0.450
Attitude						
Poor	1(1.3%)	3(3.8%)	4(5.0%)	1(1.3%)	9(11.2%)	X^2 =9.803
Moderate	13(16.3%)	21(26.3%)	14(17.5%)	11(13.8%)	59(73.8%)	P=0.133
Good	6(7.5%)	0(0.0%)	4(5.0%)	2(2.5%)	12(15.0%)	
Practice						
Poor	1(1.3%)	0(0.0%)	0(0.0%)	1(1.3%)	2(2.5%)	X^2 =5.345
Moderate	7(8.8%)	14(17.5%)	10(12.5%)	5(6.3%)	3 6(45.0%)	P=0.500
Good	12(15.0%)	10(12.5%)	12(15.0%)	8(10.0%)	42(52.5%)	
Satisfaction						
Poor	6(7.5%)	7(8.8%)	9(11.3%)	2(2.5%)	24(30.0%)	X^2 =8.195
Moderate	8(10.0%)	7(8.8%)	10(12.5%)	9(11.3%)	34(42.5%)	P=0.224
Good	6(7.5%)	10(12.5%)	3(3.8%)	3(3.8%)	2 2(27.5%)	

KAP = Knowledge, Attitude and Practice; NICU = Neonatal Intensive Care Unit

Table 3.1 **Knowledge on Hand Hygiene**

Variables	Emergency and Intensive Care Units					
	Surgical Emergency	Medical Emergency	NICU	Paediatrics Emergency	Total	Statistics
1. Which of the following is the main route of cross transmission of potential harmful germs between patient						
* Health workers hands when not clean	12(15.0%)	22(27.5%)	22(27.5%)	14(17.5%	70(87.5%)	X^2=19.352
Health workers hands when clean	8(10.0%)	2(2.5%)	0(0.0%)	0(0.0%)	10(12.5%)	P=0.000
2. **Most frequent source of germs responsible for health care associated infections**						
Hospital air	10(12.5%)	0(0.0%)	0(0.0%)	0(0.0%)	10(12.5%)	X^2=35.023
*Germs present on patient	2(2.5%)	8(10.0%)	8(10.0%)	4(5.0%)	22(27.5%)	P=.000
Hospital environment	8(10.0%)	16(20.0%)	14(17.5%)	10(12.5%	48(60.0%)	
3. Which of the following hand hygiene actions prevent transmission of germs to the patient?						
(a) Before touching a patient						
*Yes	15(18.8%)	22(27.5%)	22(27.5%)	14(17.5%	73(91.3%)	X^2=10.072
No	5(6.3%)	2(2.5%)	0(0.0%)	0(0.0%)	7(8.8%)	P=0.018
(b) Immediately after risk of body fluid exposure						
*Yes	14(17.5%)	16(20.0%)	15(18.8%)	13(16.3%	58(72.5%)	X^2=3.588
No	6(7.5%)	8(10.0%)	7(8.8%)	1(1.3%)	22(27.5%)	P=0.310
(c) After exposure to the immediate surroundings of a patient						
Yes	11(13.8%)	15(18.8%)	12(15.0%)	13(16.3%	51(63.7%)	X^2=6.618
*No	9(11.3%)	9(11.3%)	10(12.5%)	1(1.3%)	29(36.3%)	P=0.085
(d) Immediately before a clean aseptic procedure						
*Yes	16(20.0%)	12(15.0%)	16(20.0%)	13(16.3%	57(71.3%)	X^2=9.252
No	4(5.0%)	12(15.0%)	6(7.5%)	1(1.3%)	23(28.7%)	P=0.026
4. Which of the following hand hygiene actions prevents transmission of germ to the health care worker?						
(a) After touching a patient						
*Yes	17(21.3%)	22(27.5%)	19(23.8%)	14(17.5%	72(90.0%)	X^2=2.508
No	3(3.8%)	2(2.5%)	3(3.8%)	0(0.0%)	8(10.0%)	P=0.474

Table 3.2. **Knowledge on Hand Hygiene (Cont'd)**

Variables	Emergency and Intensive Care Units					
	Surgical Emergency	Medical Emergency	NICU	Paediatrics Emergency	Total	Statistics
4. Which of the following hand hygiene actions prevents transmission of germ to the health care worker?						
(b) Immediately after a risk of body fluid exposure						
*Yes	14(17.5%)	20(25.0%)	15(18.8%)	13(16.3%)	62(77.5%)	X^2=4.102
No	6(7.5%)	4(5.0%)	7(8.8%)	1(1.3%)	18(22.5%)	P=0.251
© Immediately before a clean/aseptic procedure						
Yes	6(7.5%)	19(23.8%)	12(15.0%)	11(13.8%)	48(60.0%)	X^2=13.458
*No	14(17.5%)	5(6.3%)	10(12.5%)	3(3.8%)	32(40.0%)	P=0.004
(d) After exposure to the immediate surroundings of a patient						
*Yes	8(10.0%)	16(20.0%)	13(16.3%)	13(16.3%)	50(62.5%)	X^2=10.112
No	12(15.0%)	8(10.0%)	9(11.3%)	1(1.3%)	30(37.5%)	P=0.018
5. Which of the following statements on alcohol based hand rub and hand washing with soap and water are true?						
(a) Hand rubbing is more rapid for hand cleansing than hand washing						
*True	11(13.8%)	10(12.5%)	14(17.5%)	11(13.8%)	46(57.5%)	X^2=5.396
False	9(11.3%)	14(17.5%)	8(10.0%)	3(3.8%)	34(42.5%)	P=0.145
(b) Hand rubbing causes skin dryness more than hand washing						
True	15(18.8%)	17(21.3%)	14(17.5%)	11(13.8%)	57(71.3%)	X^2=1.128
*False	5(6.3%)	7(8.8%)	8 (10.0%)	3(3.8%)	23(28.7%)	P=0.770
(c) Hand rubbing is more effective against germs than hand washing						
True	7(8.8%)	3(3.8%)	2(2.5%)	3(3.8%)	15(18.8%)	X^2=5.495
*False	13(16.3%)	21(26.3%)	20(25.0%)	11(13.8%)	65(81.3%)	P=0.139
(d) Hand washing and hand rubbing are recommended to be performed in sequence						
True	12(15.0%)	20(25.0%)	14(17.5%)	13(16.3%)	59(73.8%)	X^2=6.894
*False	8(10.0%)	4(5.0%)	8(10.0%)	1(1.3%)	21(26.3%)	P=0.075

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Table 3.3 Knowledge on Hand Hygiene (Cont'd)

Variables	Emergency and Intensive Care Units					
	Surgical Emergency	Medical Emergency	NICU	Paediatrics Emergency	Total	Statistics
6. What is the minimal time needed for alcohol based hand rub to kill most germs on your hands?						
*20 seconds	8(10.0%)	11(13.8%)	13(16.3%)	8(10.0%)	40(50.0%)	
30 seconds	8(10.0%)	12(15.0%)	6(7.5%)	4(5.0%)	30(37.5%)	X^2=16.871
40 seconds	4(5.0%)	1(1.3%)	3(3.8%)	0(0.0%)	8(10.0%)	P=0.051
50 seconds	0(0.0%)	0(0.0%)	0(0.0%)	2(2.5%)	2(2.5%)	
7. Type of hand hygiene method is required in the following situations?						
(a) Before palpation of the abdomen						
*Rubbing	7(8.8%)	14(17.5%)	11(13.8%)	12(15.0%)	44(55.0%)	X^2=8.899
Washing	13(16.3%)	10(12.5%)	11(13.8%)	2(2.5%)	36(45.0%)	P=0.031
(b) Before giving an injection						
*Rubbing	8(10.0%)	9(11.3%)	9(11.3%)	8(10.0%)	34(42.5%)	X^2=1.548
Washing	12(15.0%)	15(18.8%)	13(16.3%)	6(7.5%)	46(57.5%)	P=0.671
(c) After emptying a bed pan						
Rubbing	4(5.0%)	0(0.0%)	0(0.0%)	0(0.0%)	4(5.0%)	X^2=12.632
*Washing	16(20.0%)	24(30.0%)	22(27.5%)	14(17.5%)	76(95.0%)	P=0.006
(d) After removing examination gloves						
*Rubbing	6(7.5%)	3(3.8%)	7(8.8%)	6(7.5%)	22(27.5%)	X^2=4.633
*Washing	14(17.5%)	21(26.3%)	15(18.8%)	8(10.0%)	58(72.5%)	P=0.201
(e) After making a patients bed						
*Rubbing	0(0.0%)	11(13.8%)	4(5.0%)	3(3.8%)	18(22.5%)	X^2=13.544
Washing	20(25.0%)	13(16.3%)	18(22.5%)	11(13.8%)	62(77.5%)	P=.004
(f) after visible exposure to blood						
Rubbing	3(3.8%)	0(0.0%)	0(0.0%)	3(3.8%)	6(7.5%)	X^2=9.266
*Washing	17(21.3%)	24(30.0%)	22(27.5%)	11(13.8%)	74(92.5%)	P=0.026

**Correct Response; NICU = Neonatal Intensive Care Unit*

Table 3.4 Knowledge on Hand Hygiene (cont'd)

Variables	Emergency and Intensive Care Units					
	Surgical Emergency	Medical Emergency	NICU	Paediatrics Emergency	Total	Statistics
8. Which of the following should be avoided, as associated with increased likelihood of colonization of hands with harmful germs?						
(a) Wearing jewellery						
*Yes	18(22.5%)	20(25.0%)	20(25.0%)	11(13.8%)	69(86.3%)	X^2=1.508
No	2(2.5%)	4(5.0%)	2(2.5%)	3(3.8%)	11(13.8%)	P=.680
(b) Damaged skin						
*Yes	19(23.8%)	15(18.8%)	16(20.0%)	11(13.8%)	61(76.3%)	X^2=6.581
No	1(1.3%)	9(11.3%)	6(7.5%)	3(3.8%)	19(23.8%)	P=.087
(c) Artificial fingernails						
*Yes	15(18.8%)	18(22.5%)	18(22.5%)	13(16.3%)	64(80.0%)	X^2=2.179
No	5(6.3%)	6(7.5%)	4(5.0%)	1(1.3%)	16(20.0%)	P=0.536
(d) Regular use of a hand cream						
Yes	2(2.5%)	2(2.5%)	1(1.3%)	8(10.0%)	13(16.3%)	X^2=21.096
*No	18(22.5%)	22(27.5%)	21(26.3%)	6(7.5%)	67(83.8%)	P=0.000

**Correct Response; NICU = Neonatal Intensive Care Unit*

DISCUSSION

Hand hygiene is a simple procedure which is instrumental in reducing hospital acquired infections and cross transmission of pathogens in the hospitals and especially among the emergency and intensive care units' patients. It is important to instill correct knowledge regarding hand hygiene during training seminars or workshops.

The present study showed that majority of the staff had between moderate to good knowledge on hand hygiene which was a positive finding. However, it is important to address the gaps of knowledge with regard to sources and transmission of germs and appropriate methods of hand hygiene during their training seminars or workshops. Seventy percent (70%) of all participants knew that unhygienic hands of HCWs were the main route of transmission in a health care facility (HCF). However, only small percentage of the respondents were aware that the main source of germs in HCF was from patients and this finding cut across all emergency and intensive care units. In addressing the knowledge gaps, more emphasis should be placed on formal training in hand hygiene. This can be done by routinely conducting hand hygiene training programme using the teaching aids/materials from WHO and making the health care workers knowledgeable on hand hygiene guidelines put forth by the WHO. The hospital infection control team also has a major role to play in this regard by interacting with the various categories of HCWs emphasizing from time to time the importance of hand hygiene in curtailing HAIs and also made available infection prevention notices, posters/ five moments of hand hygiene at strategic places within the wards, ICUs, accident and emergency units. Studies have shown that these practices will positively improve and influence the knowledge of HCWs on proper hand hygiene practices and need for compliance.[23,24]

Use of alcoholic hand rub solutions or gels has been shown to be effective for hand antisepsis.[25] However, the availability of hand rub solutions in hospitals are still unsatisfactory. It is noteworthy that although alcohol hand rub was satisfactorily available in the central emergency/ICUs (though not by every patient's

bed), the staff were not aware of the situations that hand rub can be used in place of hand washing. Knowledge about hand washing as a more effective method than hand rubbing was found to be significantly better among staff in whom years of experience was >5 years when compared to the relatively new staff with years of experience <5 years. An unexpected finding was that half of the staff studied did not know that 20 seconds is the minimum time required for effective hand hygiene as documented in the WHO guideline. The overall correct responses regarding appropriate use of hand rub and hand washing was unsatisfactory and there were several gaps in their knowledge with regard to the accurate procedure. One of the reasons may be due to unavailability of enough hand rub solution in the hospital for the staff. It has been shown that increased compliance to hand hygiene can be achieved by making the hand rub solutions available at the bedside of patient.[16] Improving the knowledge of health care workers on the appropriate use of hand rubbing and encouraging its use regularly will go a long way in reducing the risks of acquiring and transmitting HAIs among patients and HCWs.

Dissatisfaction with facilities available for hand hygiene was high among the studied staff (58 out 80 respondents across the emergency and intensive care units were not satisfied with available facilities for hand hygiene). Significant proportion (70%) of the respondents were dissatisfied with the availability of the infection prevention notice in Emergency/ICU. This finding is in corroboration to those reported from studies conducted in other developing countries.[18, 26, 27] Increasing the supplies necessary for hand washing and institutional support is essential in combating substandard practices in hand hygiene. It is proposed that a quantitative measure of hand hygiene facilities be done to better assess the available resources. Therefore, there is a need to create a supportive and conducive environment that will encourage compliance with hand hygiene by ensuring availability of Water sink with constant running water, soap/antiseptics, paper/cloth for drying hands and gloves. All these should be made available per each patient's bedside.

Previous studies have shown that self-reported compliance of hand hygiene is higher than the actual compliance during the working shift.[24] However, having regular hand hygiene campaigns, displaying posters and encouraging peers to remind colleagues of hand hygiene has been shown to improve the compliance of HCWs significantly. While punitive measures should be enforced on non-compliance staff with regard hand hygiene, there should also be suitable rewards offered for those staff who complied with hand hygiene guidelines be it in the

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form of incentives or verbal or writing acceptance. This method has been found to improve the compliance of HCWs on hand hygiene practices.

As doctors and nurses are the two key players in the health care team, it is important to provide the best appropriate knowledge and proper training regarding preventive practices of infectious diseases. It is recommended that the infection prevention team of the hospitals get more involved with staff training and the updating of infection prevention notices.

In conclusion, the HCWs in the emergency and intensive care units had moderate to good knowledge on hand hygiene but satisfaction with the hand hygiene facilities is suboptimal. Hence, the need for further improvement of the existing hand hygiene training programs to address the gaps in knowledge. Furthermore, improved access to hand hygiene facilities at the training centers and active involvement of staffers to emphasize the importance of correct hand hygiene will be vital in increasing hand hygiene knowledge among HCWs.

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Conflict of interest

There are no conflicts of interest.

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