

Original Research Article

A cross sectional study to assess the vaccination practices regarding hepatitis B among health care personnel of a tertiary care hospital in Kashmir

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ABSTRACT

Background: Vaccination is one of the most successful public health interventions that has saved millions of lives so far. Due to the occupational exposure, health care workers have an increased risk of contracting hepatitis B. Objectives were to assess the vaccination practices regarding hepatitis B among healthcare personnel (HCP) and to study the factors associated with the vaccination practices regarding hepatitis B of these HCP.

Methods: This cross sectional hospital based study was conducted for a period of 1 year at Sher-I-Kashmir Institute of Medical Sciences (SKIMS) among 450 HCP including doctors, nursing staff, laboratory staff and others and the required sample was drawn from each category on the basis of probability proportionate to size technique. Information was collected from participants by using predesigned, pretested structured and validated questionnaire.

Results: It was found that only 34.9% were vaccinated against hepatitis B. The coverage was highest among doctors 55.5% followed by technicians 25.6%, nurses 23.6%. The main reasons for not receiving this vaccine were: taking all necessary precautions (49.1%), hospital does not provide the vaccine (20.8%), not aware about hepatitis B vaccine (20.5 %).

Conclusions: The study revealed that the hepatitis B vaccination coverage of these healthcare personnel was quite low in spite of the importance of the vaccine for healthcare personnel who are always at risk of getting exposed to the virus during their duties.

Keywords: Hepatitis B, Healthcare personnel, Vaccination, Behavior, Practices

INTRODUCTION

Hepatitis B infection is a significant public health issue caused by the hepatitis B virus (HBV), which spreads through contact with infected blood or bodily fluids.¹ Due to the occupational exposure, health care workers have an elevated risk of contracting hepatitis B. It is a significant issue since it can lead to chronic infection leading to liver cirrhosis, liver cancer, liver failure, and even death. Immune complexes are deposited in other body organs, mainly the kidney, causing further hepatic lesions.² Chronically infected individuals continue to be HBV

transmission carriers.¹ World health rganization estimated that, of the 35 million HCWs worldwide, 3 million experience percutaneous exposure to blood pathogens each year and 2 million of those HCWs are exposed to hepatitis B virus.³⁻⁶ In general, prevalence of HBV infection among healthcare providers is approximately ten times greater than the general population.⁷ Patients may potentially be at risk from HBV-infected HCWs due to the known danger of HBV transmission from treating physicians or other medical personnel to patients.³ According to reports in India, approximately 16-60% of HCWs have completed their HBV immunizations. The

use of general precautions such goggles, wearing gloves and proper needle disposal is inadequate among HCWs in underdeveloped nations.^{8,9} The present study was therefore taken up to study the practices of the health care personnel regarding hepatitis B vaccination.

Objectives

Objectives were to assess the vaccination practices regarding hepatitis B among healthcare personnel (HCPs) and to study the factors associated with the vaccination practices regarding hepatitis B of these health care personnel.

METHODS

This cross sectional hospital based study was conducted for a period of one year (May 2020 to April 2021) at Sher-i-Kashmir institute of medical sciences (SKIMS), a tertiary care hospital of Kashmir valley. The study participants were HCPs of SKIMS, Soura. The following were the eligibility criteria:

Inclusion criteria

HCPs of SKIMS including doctors, nurses, laboratory staff, staff from linen and laundry department and sanitation staff and HCPs giving consent to participate in the study were included from the study.

Exclusion criteria

HCPs not present in the institute during data collection period e.g., due to illness, vacation, etc., were excluded from the study.

Sample size

The sample size (n) was calculated taking prevalence (P) of hepatitis B vaccine uptake as 50%, since there were no previous similar studies available in literature in Jammu and Kashmir. Using the sample size formula, a sample size of 384 was obtained. Allowing for non-response rate of 15% and rounding off finally a sample size of 450 was decided to be taken.

Sampling technique

In the first stage, the total number of HCPs of the institute i.e., doctors, nurses, laboratory personnel, sanitation staff, staff from linen and laundry department was obtained. The proportion of HCPs constituted by different professional categories calculated was doctors (36.4%), nursing staff (38.7%), technician/technologist (18.2%) and others (6.7%).

Based on the above proportions, the required sample from each category was determined using the PPS (probability proportionate to size) technique. Accordingly, the number

participants to be included in the sample from each category was as follows:

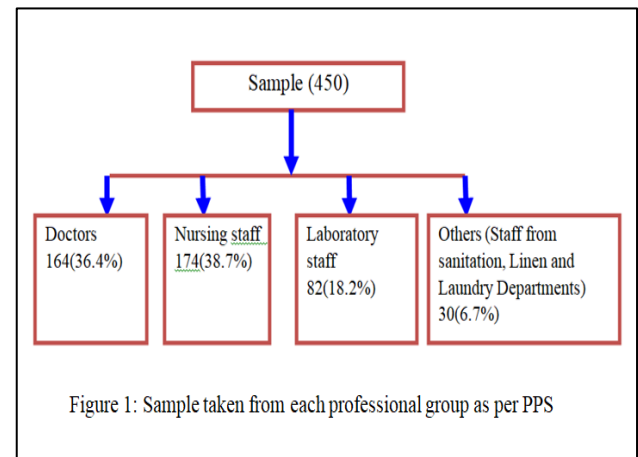


Figure 1: Sample taken from each professional group as per PPS.

For this purpose, a professional category wise list of HCPs was prepared and the required sample was drawn from each category by systematic random sampling. The HCPs thus selected, were approached on the day of visit to concerned department based on a schedule prepared. Participants were explained the purpose of the study by way of an information sheet and necessary written consent was taken from them to participate in the study. In case the participant was not available on the first visit a maximum of 3 visits were made for each participant till the required sample was obtained.

Study instrument

Information was collected from participants by using a predesigned, pretested structured and validated questionnaire. The HCPs vaccination behaviour and their own vaccination practices with regard to hepatitis B vaccine and reasons for refusal, where applicable, were asked.

Statistical analysis

Data was entered and analyzed in SPSS version 23. Categorical data was summarized as frequencies and percentages whereas continuous data was summarized as mean and standard deviations. Chi-square test and Fisher's Exact test was used to test the relationship between two categorical variables.

Ethical clearance was obtained from the institutional ethical committee of SKIMS Soura.

RESULTS

A total of 450 HCPs formed the study participants. Table 1 depicts vaccination practices of the HCPs regarding hepatitis B vaccine. A total of 157 (34.9%) were

vaccinated against hepatitis B. Among the vaccinated participants 78 (49.7%), 58 (36.9%) and 21 (13.4%) had received three, two doses and only one dose respectively. The time since the last dose was above five years in 67 (42.7%) and 3 years in 50 (31.8 %). Only 7 (4.5%) of the vaccinated participants had got their post vaccination titers done. Among 293 (65.1%) un-vaccinated participants, the main reasons for not receiving this vaccine were: did not need the vaccine as they take all necessary precautions (144, 49.1%), hospital did not provide the vaccine (61, 20.8%), unaware about hepatitis B vaccine (60, 20.5 %) and being at risk of getting hepatitis B in 27 (9.2%).

Table 2 depicts the association between hepatitis B vaccination coverage among healthcare personnel and their general characteristics.

Hepatitis B vaccination coverage was 42.5% in >50 years age-group followed by 37.5% in the age group of 20-30years. The difference in vaccination coverage across age groups was not statistically significant ($\chi^2 = 1.990, p = 0.573$).

The proportion of HCPs vaccinated against hepatitis B was almost similar in males 35.8% and females 34.3%. Among the rural HCPs, 24.5% were vaccinated against hepatitis B compared to 39.5% among the urban. The difference in hepatitis B vaccine coverage by residence was statistically significant ($\chi^2 = 9.629, p = 0.002$).

Around 32% of HCPs from nuclear families were vaccinated against hepatitis B compared to 40.1% from joint families. However, the difference was not statistically significant ($\chi^2 = 3.053, p = 0.081$).

Among the healthcare personnel from medicine and allied branches, (34.3%) were vaccinated against hepatitis B, 33.6% from the surgery and allied branches (42.7%) from laboratory sciences and 8.3% from 'others' category of department. However, the difference across departments in uptake of hepatitis B vaccine was not statistically significant ($\chi^2 = 6.063, p = 0.109$).

Hepatitis B vaccination coverage was associated with the highest educational qualification of the healthcare personnel and the association was statistically significant ($\chi^2 = 49.610, p < 0.001$). The highest hepatitis B vaccination coverage was seen among the healthcare personnel with MBBS/MD/MS/DM (55.5%) followed by those with BSc/MSc nursing (28.3%), BSc/MSc/DMLT (22.6%) and in 8th/10th/12th standard (16.1%).

There was a statistically significant association between professional category of the healthcare personnel and the hepatitis B vaccination coverage ($\chi^2 = 43.702, p < 0.001$). The coverage was highest among doctors 55.5% followed by technicians and technologists 25.6%, nurses, 23.6% and among the 'others' professional category (13.3%).

The hepatitis B vaccine coverage was more in the upper socioeconomic class (35.9%) compared to 18.5% in the middle and lower socioeconomic class. However, the difference was not statistically significant ($\chi^2 = 3.389, p = 0.066$).

The hepatitis B vaccine uptake in the healthcare personnel with less than 10 years of service was 37.3% while 31.8% of healthcare personnel were vaccinated against hepatitis B vaccine among those with more than 10 years of service. This difference was not statistically significant ($\chi^2 = 1.486, p = 0.223$).

Among those who had received training regarding vaccines and immunization, 65.7% were vaccinated against Hepatitis B compared to those who had not received any training (32.3%). This difference was statistically significant ($\chi^2 = 15.875, p < 0.01$).

Figure 2 depicts vaccine hesitancy among healthcare personnel regarding the hepatitis B vaccine. It was found that 179 (39.8%) showed hesitancy towards hepatitis B vaccine.

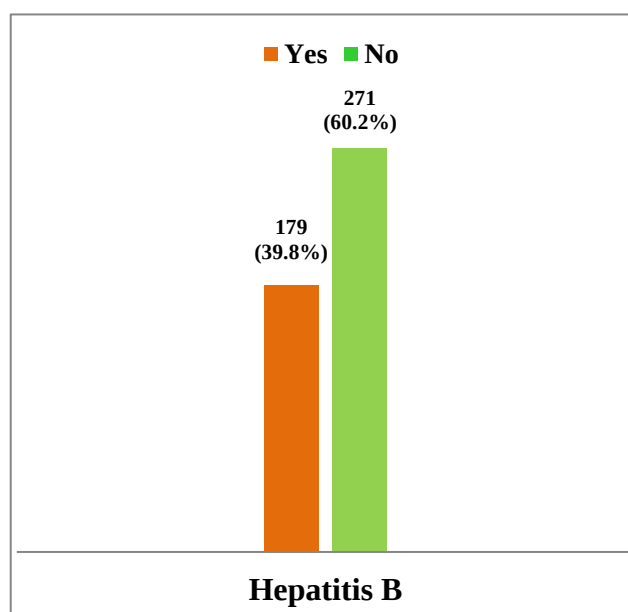


Figure 2: Vaccine hesitancy among healthcare personnel regarding hepatitis B vaccine.

Table 3 depicts the association between vaccine hesitancy of the healthcare personnel towards hepatitis B vaccine and their general characteristics.

In the age-group of 20-30 years, 33.3% healthcare person were hesitant towards hepatitis B vaccine while in the age-group of 31-40 years, 39.5% were hesitant while vaccine hesitancy towards hepatitis B vaccine was 42.7% and 32.5% in age-groups of 41-50 years and >50 years respectively. These differences were not however statistically significant ($\chi^2 = 1.911, p = 0.591$).

The 38.9% male healthcare personnel were hesitant towards hepatitis B vaccine while among females, vaccine hesitancy towards hepatitis B was 40.5%, the difference not being statistically significant ($\chi^2 = 0.157, p = 0.692$).

44.6% rural healthcare personnel versus 37.7% urban healthcare personnel were hesitant towards influenza vaccine. This difference was not statistically significant ($\chi^2 = 1.956, p = 0.162$).

Vaccine hesitancy towards hepatitis B vaccine was almost similar in healthcare personnel belonging to nuclear (40.3%) and joint families (39%) ($\chi^2 = 0.083, p = 0.773$).

Comparing by the number of family members, 40.7% healthcare personnel having up to 5 members in their families were hesitant towards hepatitis B vaccine and this proportion was 37.9% among the healthcare personnel having more than 5 members in their families. This difference was not statistically significant ($\chi^2 = 0.305, p = 0.581$).

Among the healthcare personnel from medicine and allied departments, 41.2% were hesitant towards hepatitis B vaccine while from surgery and allied departments, 40% were hesitant. Vaccine hesitancy towards hepatitis B vaccine was seen among 35.4% and 41.7% from laboratory sciences and 'others' category of department respectively. This difference was not statistically significant ($\chi^2 = 870, p = 0.833$).

There was a statistically significant association between the highest educational qualification of the healthcare

personnel and the vaccine hesitancy towards hepatitis B vaccine ($\chi^2 = 31.841, p < 0.001$) with the highest vaccine hesitancy among those with BSc/MSc/DMLT (51.8%) followed by BSc/MSc Nursing (48.3%), 8th/10th/12th standard (32.3%) and MBBS/MD/MS/DM (23.8%).

The association between professional category of the healthcare personnel and the vaccine hesitancy towards hepatitis B vaccine was also statistically significant ($\chi^2 = 35.321, p < 0.001$) with the highest vaccine hesitancy among technicians and technologists (61%) followed by nursing staff (45.4%), 'others' (36.7%) and doctors (23.8%).

Based on socio-economic status, among the healthcare personnel from the upper socioeconomic class 40.4% were hesitant while among the healthcare personnel from the lower and middle class 29.6% were hesitant towards hepatitis B vaccine. However, this difference was not statistically significant ($\chi^2 = 1.235, p = 0.266$).

Among the healthcare personnel with up to 10 years of service 36.1% were hesitant towards hepatitis B vaccine while in healthcare personnel with more than 10 years of service, vaccine hesitancy towards hepatitis B was 44.3%. The association between years of service and vaccine hesitancy towards hepatitis B vaccine was not however statistically significant ($\chi^2 = 3.072, p = 0.08$).

Among the healthcare personnel who had received a training regarding vaccines and immunization 20% were hesitant towards hepatitis B vaccine compared to 41.4% of those who had not received any such training and this difference was statistically significant ($\chi^2 = 6.197, p = 0.013$).

Table 1: Vaccination practices among study population regarding hepatitis B vaccine.

Hepatitis B vaccination status		N (%)
Vaccinated		157 (34.9)
Unvaccinated		293 (65.1)
Number of doses received, (n=157)	One	21 (13.4)
	Two	58 (36.9)
	Three	78 (49.7)
Years since last dose, (n=157)	1	11 (7.0)
	2	29 (18.5)
	3	50 (31.8)
	>5	67 (42.7)
Post vaccination titer done, (n=157)	Yes	7 (4.5)
	No	150 (95.5)
Reasons for not receiving vaccine*, (n=293)	'I am not at risk of getting hepatitis-B'	27 (9.2)
	'Hepatitis-B vaccine can give adverse reaction'	4 (1.4)
	'I do not need because I take all necessary precautions'	144 (49.1)
	'Not aware'	60 (20.5)
	'Hospital is not providing the vaccine'	61 (20.8)
Total		450

*Some participants gave more than one response.

Table 2: Association between hepatitis B vaccination coverage among healthcare personnel and their general characteristics.

General characteristics		Vaccinated, n (%)	Unvaccinated, n (%)	X ² , (p)
Age-group (Years)	20-30	9 (37.5)	15 (62.5)	1.990 (0.573)
	31-40	77 (35.8)	138 (64.2)	
	41-50	54 (31.6)	117 (68.4)	
	>50	17 (42.5)	23 (57.5)	
Gender	Male	63 (35.8)	113 (64.2)	0.105 (0.746)
	Female	94 (34.3)	180 (65.7)	
Residence	Rural	34 (24.5)	105 (75.5)	9.629 (0.002)
	Urban	123 (39.5)	188 (60.5)	
Type of family	Nuclear	92 (31.9)	196 (68.1)	3.053 (0.081)
	Joint	65 (40.1)	97 (59.9)	
No. of family members	≤5	101 (33.1)	204 (66.9)	1.312 (0.252)
	>5	56 (38.6)	89 (61.4)	
Department	Medicine and allied	74 (34.3)	142 (65.7)	6.063 (0.109)
	Surgery and allied	47 (33.6)	93 (66.4)	
	Laboratory sciences	35 (42.7)	47 (57.3)	
	Others ¹	1 (8.3)	11 (91.7)	
Highest educational qualification	MBBS/MD/MS/DM	91 (55.5)	73 (44.5)	49.610 (<0.001)
	BSc/MSc nursing	17 (28.3)	43 (71.7)	
	BSc/MSc/DMLT	44 (22.6)	151 (77.4)	
	8 th /10 th /12 th	5 (16.1)	26 (83.9)	
Professional category	Doctor	91 (55.5)	73 (44.5)	49.702 (<0.001)
	Nursing staff	41 (23.6)	133 (76.4)	
	Technician/technologist	21 (25.6)	61 (74.4)	
	Others ²	4 (13.3)	26 (86.7)	
Socioeconomic status	Upper class	152 (35.9)	271 (64.1)	3.389 (0.066)
	Middle class and lower class ³	5 (18.5)	22 (81.5)	
Years of service	≤10	93 (37.3)	156 (62.7)	1.486 (0.223)
	>10	64 (31.8)	137 (68.2)	
Received any training regarding vaccines and immunization	Yes	23 (65.7)	12 (34.3)	15.875 (<0.01)
	No	134 (32.3)	281 (67.7)	

¹Others in the department include the departments of Sanitation and the department of Linen and laundry. ²Others in the professional category include sanitation staff and the linen and laundry staff. ³For the purpose of analysis, participants of lower (class V) and middle (class II, III and IV) class were merged together (only 4 participants belonged to lower class).

Table 3: Association between vaccine hesitancy of the healthcare personnel towards hepatitis B vaccine and their general characteristics.

General characteristics		Hesitancy (towards hepatitis B)		X ² , (p)
		Yes, n (%)	No, n (%)	
Age-group (Years)	20-30	8 (33.3)	16 (66.7)	1.911 (0.591)
	31-40	85 (39.5)	130 (60.5)	
	41-50	73 (42.7)	98 (57.3)	
	>50	13 (32.5)	27 (67.5)	
Gender	Male	68 (38.9)	108 (61.1)	0.157 (0.692)
	Female	111 (40.5)	163 (59.5)	
Residence	Rural	62 (44.6)	77 (55.4)	1.956 (0.162)
	Urban	117 (37.7)	194 (62.4)	
Type of family	Nuclear	116 (40.3)	172 (59.7)	0.083 (0.773)
	Joint	63 (39)	99 (61)	
No of family members	≤5	124 (40.7)	181 (59.3)	0.305 (0.581)
	>5	55 (37.9)	90 (62.1)	

Continued.

General characteristics		Hesitancy (towards hepatitis B)		X ² , (p)
		Yes, n (%)	No, n (%)	
Department	Medicine and allied	89 (41.2)	127 (58.8)	0.870 (0.833)
	Surgery and allied	56 (40.0)	84 (60.0)	
	Laboratory sciences	29 (35.4)	53 (64.6)	
	Others ¹	5 (41.7)	7 (58.3)	
Highest educational qualification	MBBS/MD/MS/DM	39 (23.8)	125 (76.2)	31.841 (<0.001)
	BSc/MSc Nursing	29 (48.3)	31 (51.7)	
	BSc/MSc/DMLT	101 (51.8)	94 (48.2)	
	8 th /10 th /12 th	10 (32.3)	21 (67.7)	
Professional category	Doctor	39 (23.8)	125 (76.2)	35.321 (<0.001)
	Nursing staff	79 (45.4)	95 (54.6)	
	Technician/ technologist	50 (61.0)	32 (39.0)	
	Others ²	11 (36.7)	19 (63.3)	
Socioeconomic status	Upper class	171 (40.4)	252 (59.6)	1.235 (0.266)
	Middle class and lower class ³	8 (29.6)	19 (70.4)	
Years of service	≤10	90 (36.1)	159 (63.9)	3.072 (0.08)
	>10	89 (44.3)	112 (55.7)	
Received any training regarding vaccines and immunization	Yes	7 (20.0)	28 (80.0)	6.197 (0.013)
	No	172 (41.4)	243 (58.6)	

¹Others in the department include the departments of Sanitation and the department of Linen and laundry. ²Others in the professional category include the sanitation staff and the linen and laundry staff. ³For the purpose of analysis, participants of lower (class V) and middle (class II, III and IV) class were merged together (only 4 participants belonged to lower class).

DISCUSSION

In our study only 34.9% were vaccinated against hepatitis B representing a low uptake of one of the most essential vaccines required by healthcare professionals. The most common reason for the low uptake as given by the HCPs was that “they did not need the vaccine as they already take all necessary precautions” followed by “non availability of the vaccine free of cost in the hospital” (20.8%). In the studies conducted by Yuan et al, Maltezou et al, Liu et al, Burnett et al, Guthmann et al and Chaudhari et al the uptake of hepatitis B vaccine was 79%, 55.7%, 80.8%, 67.9%, 91.7% and 57.7% respectively.¹⁰⁻¹⁵ Non-accessibility of the vaccine was stated as the reason for not receiving the vaccine by 31.1% of HCP in a study conducted by Chaudhari et al.¹⁵ Lack of availability was the most common reason in a study conducted by Dayyab et al.¹⁶ As reported by Yuan et al the coverage of hepatitis B vaccination was 1.4 times more at workplaces offering free hepatitis B vaccine than those which did not provide the vaccine free.¹⁰ In our study a good number (20.5%) of HCP reported lack of awareness regarding the Hepatitis B vaccine. The importance of hepatitis B vaccine thus seems to be undermined by most of the HCP in our study. Also, the lack of awareness among healthcare workers reflects a gap in the knowledge of these HCP.

There was no significant association of hepatitis B vaccine uptake with age, gender, type of family, number of family members, department, years of service. Contrary to our study, age was significantly associated

with hepatitis B vaccine uptake in a study conducted by Liu et al with more uptake in younger age groups.¹² Years of service and vaccination confidence have shown a paradoxical relation with hepatitis B uptake in our HCP although the association was not statistically significant. Professional experience (working years) and perceived safety of vaccination have been shown to be significantly associated with hepatitis B vaccine uptake in a study conducted by Gatnet et al.¹⁷

Urban HCP had higher uptake of hepatitis B vaccination compared to rural. The reason might be the high accessibility of hepatitis B vaccine in the private sector in urban areas than in rural areas because the vaccine is not provided in the institute and has to be purchased by the HCP. Also, more doctors were found to have taken the vaccine compared to other professional groups. This might be because hepatitis B vaccine is to be taken by one's own will and doctors have more knowledge about the long term consequences of the infection and are aware of their risk level compared to other professional groups. Our findings are supported by an association of professional qualification with hepatitis B uptake as has been documented by Gatnet et al.¹⁷ Being a doctor was also significantly associated with being vaccinated against hepatitis B in a study conducted by Burnett et al.¹³ In our study HCP having training regarding vaccines had a higher uptake of hepatitis B vaccine compared to those who were not trained. These findings were supported by study conducted by Awoke et al.¹⁸

There was no association between hepatitis B uptake and general characteristics except residence, professional category and education and training regarding vaccines. Similarly, hepatitis B vaccine hesitancy was found to be associated with professional category and education with the highest hesitancy among those who were technicians or technologists compared to other HCP and among those who had an educational qualification of BSc/MSc/DMLT. This may reflect a lack of knowledge and awareness regarding hepatitis B as a disease of concern (owing to its long term complications) among these workers. The uptake was found to be highest among doctors which may also be because of a better knowledge among doctors. Those who had received a training regarding vaccines were found to have lower vaccine hesitancy towards hepatitis B vaccine which was in accordance with the findings of Yuan et al.¹⁰

Strengths and limitations

The study was first of its kind with adequate sample size in Kashmir valley and will serve as a reference for future studies. The cross-sectional study design was apt for giving the prevalence but for understanding the attitude and practices, a qualitative study design would give us better results.

CONCLUSION

The study revealed that the hepatitis B vaccination coverage of these healthcare personnel was quite discouraging in spite of the importance of the vaccine for healthcare personnel who are always at risk of getting exposed to the virus during their duties. A good number (20.8%) of HCP were not aware of the importance of hepatitis B vaccination. Majority (92.2%) of the healthcare personnel had not received any training regarding vaccines and immunization which represents a gap in the area that needs redressal.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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