

# Vaccination Practices Regarding Seasonal Influenza Vaccine Among Healthcare Workers of a Tertiary Care Hospital in Kashmir: A Cross-Sectional Study

Basina Gulzar<sup>1</sup>, Syed Najmul Ain<sup>2</sup>

<sup>1</sup>Department of Community Medicine SKIMS Soura Kashmir, <sup>2</sup>Department of Community Medicine, GMC Handwara, Kashmir, India

Corresponding Author: Dr. Syed Najmul Ain

DOI: <https://doi.org/10.52403/ijhsr.20260502>

## ABSTRACT

**Background:** Influenza is one of the significant threats in today's world and vaccination is the main effective tool for its prevention.

**Objective:** To assess the vaccination practices regarding seasonal influenza vaccine among healthcare personnel of a tertiary care hospital and to assess the factors associated with these vaccination practices.

**Methodology:** It was a cross-sectional hospital-based study with healthcare personnel being the study subjects. Sample size was calculated and a sample of 450 was targeted. Sampling technique was PPS for taking sample from different categories of workers followed by systematic sampling. Information was collected by using a predesigned, structured and validated questionnaire. The data was entered and analyzed using SPSS version 23.

**Results:** Among the 450 healthcare personnel, 215 (47.8%) were 31-40 years old with female preponderance (N=274, 60.8%). A total of 413(91.8%) participants had taken the last seasonal influenza vaccine. The main reasons for vaccine acceptance were: for self-protection (95.8%), for protection of family members (59.8%), and being available free of cost (52%). Main reasons for non-acceptance were: "people get flu despite vaccination" (97.2%), "vaccine makes you sick" (48.6%) and "not knowing about it" (18.9%).

**Conclusion:** Vaccination uptake of seasonal influenza vaccine was high in our study. Since there is some vaccine hesitancy in the healthcare workers, regular awareness programs and trainings need to be given to healthcare workers to build vaccination confidence. Besides healthcare workers also need to be made aware that the vaccine is available free of cost to all healthcare workers wherever it is.

**Key words:** Vaccines, Influenza, Health Personnel, Vaccination Hesitancy, Awareness

## INTRODUCTION

Influenza poses a global threat, resulting in significant mortality and morbidity. (1) Vaccination is one of the most successful public health interventions that has saved millions of lives so far. (2)

Vaccines are the most important tool for prevention of flu. (3-5)

In the recent years, public health services have been fighting against a growing skepticism towards vaccines. (6) Even the HCPs refuse to be vaccinated against influenza. (7)

HCPs' readiness to suggest immunization is found to rise with increased awareness and knowledge. Studies based on self-reports from lay people show that, in general, HCWs are considered to be the most reliable source of vaccine information. (8,9) Advice given by HCWs is the most commonly reported reason for vaccine acceptance among the general population, while lack of recommendation is mentioned as a reason for non-vaccination. (10,11)

**Objectives:** The objectives were to assess the vaccination practices regarding seasonal influenza vaccine among healthcare personnel of the tertiary care hospital and to assess the factors associated with vaccination practices regarding seasonal influenza vaccine among these healthcare personnel.

## MATERIALS & METHODS

This study was conducted for a period of one year (2021) at Sher-i-Kashmir Institute of Medical Sciences (SKIMS), a tertiary care hospital of Kashmir valley.

**Study Design:** It was a cross-sectional hospital-based study.

**Study area:** The study was conducted at Sher-i-Kashmir Institute of Medical Sciences, a tertiary care institute of the UT of Jammu and Kashmir located in Soura, Srinagar.

**Study participants:** The study participants were Health Care Personnel of tertiary care hospital SKIMS, Soura. The following were the eligibility criteria:

### Inclusion criteria:

1. Health care personnel of SKIMS Soura viz doctors, nurses, laboratory staff, staff from linen and laundry department and sanitation staff.
2. Health care personnel giving consent to participate in the study.

**Exclusion criteria:** Healthcare personnel not present in the institute during data collection period e.g. due to illness, vacation, etc.

**Sample Size:** The sample size (n) was calculated using vaccine acceptance rate as 36.78% from a previous study.

The formula used was

$$n = z^2 \frac{P(1 - P)}{e^2}$$

Where n = estimated sample size

P= expected prevalence

Z= statistic for 95% level of confidence (1.96)

e = allowable error

Taking "e" as 5%,

$$n = (1.96)^2 \frac{(0.368) \times (1 - 0.368)}{(0.05)^2}$$
$$n = 358$$

Adding a non-response rate of 15%, n = 410. A sample size of 450 was decided to be taken.

**Sampling technique:** In the first stage, the list of all Health Care Personnel (HCP) of the institute which included the different professional categories i.e. doctors, nurses, laboratory personnel, sanitation staff, staff from linen and laundry department was obtained from the administration. Based on the above proportions, the required sample to be drawn from each professional category was determined using the Probability Proportionate to Size (PPS) technique. Accordingly, the number of the participants to be included in the sample from each professional category was as follows: doctors 164(36.4%), nursing staff 174 (38.7%), laboratory staff 82(18.2%) and other staff 30(6.7%).

The required sample was drawn from each category by systematic random sampling using employee IDs.

**Data collection:** The data was collected for a period of one year (2021). Participants were explained the purpose of the study through a participant information sheet and necessary written consent was taken from them to participate in the study.

**Study instrument:** Information was collected from the participants by using a

predesigned, pretested structured and validated questionnaire prepared on the basis of literature review and inputs from experts. The questionnaire included questions pertaining to socio-demographic characteristics, vaccination practices and vaccine hesitancy with regard to seasonal influenza vaccine.

### Statistical Analysis

The data was entered and analyzed in SPSS version 23. The categorical data was summarized as frequencies and percentages

whereas the continuous data was summarized as mean and standard deviations. Chi-square test and Fisher's Exact test were used to test the relationship between two categorical variables.

### RESULT

A total of 450 health care personnel participated in the study (table 1) among whom 215 (47.8%) study participants were 31-40 years old with female preponderance (N=274, 60.8%).

**Table 1: Distribution of study population by general characteristics of the participants**

Characteristics	N	(%)
Age-group (years)	20-30	24 5.3
	31-40	215 47.8
	41-50	171 38.0
	>50	40 8.9
Gender	Male	176 39.2
	Female	274 60.8
Residence	Rural	139 30.8
	Urban	311 69.2
Type of family	Nuclear	288 64.0
	Joint	162 36.0
Educational qualification	MBBS/MD/MS/DM	164 36.4
	BSc/MSc Nursing	60 13.3
	BSc/MSc/DMLT	195 43.4
	8th/10th/12 <sup>th</sup> standard	31 6.9
Department	Medicine/allied branches	216 48.0
	Surgery & allied branches	140 31.1
	Laboratory sciences	82 18.2
	Others <sup>1</sup>	12 2.7
Professional category	Doctor	164 36.4
	Nursing staff	174 38.7
	Technician/technologist	82 18.2
	Others <sup>2</sup>	30 6.7
Years of service	≤10	249 55.3
	>10	201 44.7
Socioeconomic status <sup>3</sup>	I-Upper Class	423 94.0
	II-Upper Middle Class	11 2.4
	III-Middle Class	0 0
	IV-Lower Middle Class	12 2.7
	V-Lower Class	4 0.9
Received any training regarding immunization	Yes	35 7.8
	No	415 92.2
<b>Total</b>	<b>450</b>	<b>100</b>

<sup>1</sup>Others include the departments of Sanitation, Linen and laundry.

<sup>2</sup>Others include sanitation workers, casual labourers etc.

<sup>3</sup>BG Prasad scale of SES

Majority 311(69.8%) participants were from urban areas. A total of 288 (64.0%) study

participants belonged to nuclear families. About 43% (N=195) had a qualification of

either BSc, MSc or diploma, followed by 164(36.4%) and 216(48%) belonged to Medicine and allied department. Majority 174(38.7%) comprised of nursing staff followed by 164(36.4%) doctors and 249 (55.3%) healthcare workers had less than 10

years of work experience. About 94% (423) HCWs belonged to Upper Class of socioeconomic status. Majority of the participants 415(92.2%) had never received any training regarding immunization.

**Table 2: Vaccination practices among study population regarding Seasonal Influenza vaccine**

		N (%)
<b>Did u take last seasonal influenza vaccine</b>	<b>Yes</b>	<b>413(91.8)</b>
	<b>No</b>	<b>37(8.2)</b>
<b>Reasons for receiving the vaccine* (N=413)</b>	'For self protection'	396(95.8)
	'To protect patients'	156(37.8)
	'To protect family members'	247(59.8)
	'Influenza is effective vaccine'	66(15.9)
	'I want to avoid missing work on account of flu'	12(2.9)
	'Personal physician recommended the vaccine'	3(0.72)
	'Professional responsibility'	108(26.2)
	'Free of charge in institute'	216(52.3)
	'Benefits outweigh the risks'	44(10.7)
<b>Reasons for not receiving the vaccine* (N=37)</b>	'I was not knowing about it'	7(18.9)
	'Never had flu, so I don't need it'	3(8.1)
	'Follow all hand hygiene and respiratory etiquettes'	3(8.1)
	'Vaccine makes you sick'	18(48.6)
	'The flu is not that serious'	1(2.7)
	'The said vaccine made one of my colleagues sick'	4(10.8)
	'People getting flu despite of receiving vaccine'	36(97.2)
<b>Total</b>		<b>450(100)</b>

\*more than one response was given by one participant

A total of 413(91.8%) participants had taken the last seasonal influenza vaccine (table 2). The main reasons for receiving the vaccine as mentioned by the participants were: for self-protection in 396(95.8%), for protection of family members in 247(59.8%), and being available free of cost in the institute 216(52%).

Among the 37 (8.2%) participants who had not taken the last flu shot, the main reasons for the same as mentioned by the participants were: "people get flu despite vaccination" in 36(97.2%), "vaccine makes you sick" in 18(48.6%), and "not knowing about it" in 7(18.9%).

**Table 3: Association between the seasonal influenza vaccine uptake of the healthcare personnel and their general characteristics**

General Characteristics		Received the last seasonal influenza vaccine; N(%)	$\chi^2(p)$
<b>Age-group (years)</b>	20-30	23(95.8)	0.721 (0.870)*
	31-40	196(91.2)	
	41-50	156(91.2)	
	>50	38(95.0)	
<b>Gender</b>	Male	160(90.9)	0.289 (0.591)
	Female	253(92.3)	
<b>Residence</b>	Rural	126(90.6)	0.341 (0.560)
	Urban	287(92.3)	

Type of family	Nuclear	264(91.7)	0.013 (0.909)
	Joint	149(92.0)	
No of family members	≤5	283(92.8)	1.277 (0.258)
	>5	130(89.7)	
Department	Medicine & allied	197(91.2)	2.085 (0.551)
	Surgery & allied	132(94.3)	
	Laboratory sciences	73(89)	
	Others <sup>1</sup>	11(91.7)	
Highest educational qualification	MBBS/MD/MS/DM	140(85.4)	39.737 (<0.001)*
	BSc/MSc Nursing	60(100)	
	BSc/MSc/DMLT	191(97.9)	
	8th/10th/12 <sup>th</sup>	22(71.0)	
Professional category	Doctor	140(85.4)	43.538 (<0.001)
	Nursing staff	173(99.4)	
	Technician/Technologist	79(96.3)	
	Others <sup>2</sup>	21(70.0)	
Socioeconomic status	Upper class	395(93.4)	<0.001**
	Middle class & lower class <sup>3</sup>	18(66.7)	
Years of service	≤10	223(89.6)	3.369 (0.056)
	>10	190(94.5)	
Received any training regarding vaccines and immunization	Yes	32(91.4)	>0.05**
	No	381(91.8)	

\*Implies that Fisher's Exact test was used. \*\*Only "P value" was stated as the SPSS could not compute the Exact statistic.

<sup>1</sup>Others in the department include the departments of Sanitation and the department of Linen and laundry.

<sup>2</sup>Others in the professional category include the sanitation staff and the linen and laundry staff.

<sup>3</sup>For 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).

The relationship of vaccine uptake with age group (*Exact statistic* = 0.721,  $p = 0.870$ ), gender ( $x^2 = 0.289, p = 0.591$ ), residence ( $x^2 = 0.341, p = 0.560$ ), type of family ( $x^2 = 0.013, p = 0.909$ ) and department was not statistically significant ( $x^2 = 2.085, p = 0.551$ ).

There was a statistically significant relationship between seasonal influenza vaccine uptake and the educational qualification of the healthcare personnel (*Exact statistic* = 39.737,  $p < 0.001$ ).

The highest seasonal influenza vaccine uptake (100%) was seen in the healthcare personnel with the educational qualification of BSc/MSc Nursing followed by those with BSc/MSc/DMLT (97.9%), MBBS/MD/MS/DM (85.4%) and 8th/10th/12<sup>th</sup> standard (71.0%).

Likewise, there was a statistically significant association between professional category of the healthcare personnel and the seasonal influenza vaccine uptake ( $x^2 = 43.538, p < 0.001$ ). The uptake was highest among nurses (99.4%) followed by technicians and technologists (96.3%), doctors (85.4%) and 'others' professional category (70.0%).

The association between the socio-economic status and influenza vaccine uptake was also statistically significant ( $p < 0.001$ ), 93.4% in upper class compared to 66.7% in the middle and lower class.

There was no significant association of seasonal influenza vaccine uptake with the years of service and training regarding immunization.

**Table 4: Association between vaccine hesitancy of healthcare personnel towards influenza vaccine and their general characteristics**

General Characteristics		Hesitancy (towards influenza vaccine) N(%)	$\chi^2$ (p)
Age-group (years)	20-30	1(4.2)	1.071 (0.791)*
	31-40	15(7)	
	41-50	15(8.8)	
	>50	4(10.0)	
Gender	Male	16(9.1)	0.695 (0.405)
	Female	19(6.9)	
Residence	Rural	8(5.8)	1.147 (0.284)
	Urban	27(8.7)	
Type of family	Nuclear	25(8.7)	0.909 (0.340)
	Joint	10(6.2)	
No of family members	≤5	22(7.2)	0.421 (0.517)
	>5	13(9.0)	
Department	Medicine & allied	20(9.3)	3.626 (0.305)
	Surgery & allied	7(5.0)	
	Laboratory sciences	8(9.8)	
	Others <sup>1</sup>	0(0.0)	
Highest educational qualification	MBBS/MD/MS/DM	27(16.5)	25.091 (<0.001)*
	BSc/MSc Nursing	0(0.0)	
	BSc/MSc/DMLT	7(3.6)	
	8 <sup>th</sup> /10 <sup>th</sup> /12 <sup>th</sup>	1(3.2)	
Professional category	Doctor	27(16.5)	30.685 (<0.001)
	Nursing staff	1(0.6)	
	Technician/ Technologist	6(7.3)	
	Others <sup>2</sup>	1(3.3)	
Socioeconomic status	Upper class	34(8.0)	0.711 <sup>*s</sup>
	Middle class & lower class <sup>3</sup>	1(3.7)	
Years of service	≤10	20(8.0)	0.050 (0.823)
	>10	15(7.5)	
Received any training regarding vaccines and immunization	Yes	5(14.3)	0.176 <sup>*s</sup>
	No	30(7.2)	

\*Implies that Fisher's Exact test was used. <sup>s</sup>Only "P value" was stated as the SPSS could not compute the Exact statistic.

<sup>1</sup>Others in the department include the departments of Sanitation and the department of Linen and laundry.

<sup>2</sup>Others in the professional category include the sanitation staff and the linen and laundry staff.

<sup>3</sup>For 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).

The proportion of vaccine hesitant HCPs increased with age-group. However, this relationship not statistically significant (*Exact statistic* = 1.071,  $p = 0.791$ ). Similarly, the association of vaccine hesitancy towards seasonal influenza with gender ( $\chi^2 = 0.695$ ,  $p = 0.405$ ), residence ( $\chi^2 = 1.147$ ,  $p = 0.284$ ), type of family ( $\chi^2 = 0.909$ ,  $p = 0.340$ ) and department was not statistically significant ( $\chi^2 = 3.626$ ,  $p = 0.305$ ).

There was a statistically significant association between the educational qualification of healthcare personnel and the vaccine hesitancy towards influenza vaccine (*Exact statistic*= 25.091,  $p < 0.001$ ) with the highest vaccine hesitancy among those who were MBBS/MD/MS/DM (16.5%) and the lowest vaccine hesitancy among those with the educational qualification of 8<sup>th</sup>/10<sup>th</sup>/12<sup>th</sup> standard (3.2%).

The association between professional category of the healthcare personnel and the

vaccine hesitancy towards influenza vaccine was also statistically significant ( $\chi^2 = 30.685, p < 0.001$ ) with highest vaccine hesitancy among doctors 16.5% and least among those from 'others' in the professional category (3.3%).

The association of vaccine hesitancy with socio-economic status, years of experience and training regarding vaccines was not statistically significant.

## **DISCUSSION**

Majority (85.8%) of the participants belonged to the age-group of 31-50 years. Almost similar findings were reported in a study by Maltezou HC et al. (12) in which 64.5% of the participants belonged to the age-group of 31-50 years respectively.

Female preponderance like in our study was also reported in studies conducted by Brandt C et al (59.7%) (13) and Burnett RJ et al (68.2%) (14).

Most (69.2%) of the participants were from urban areas which was almost in accordance with a study conducted by Pulcini C et al. (82.7% urban). (15)

In our study most of the participants (48%) were from the Medicine and allied branches since this is the largest department of the SKIMS followed by surgery and allied branches (31.1%).

Most of our study participants were nurses followed by doctors. This was in accordance with the proportion of different professional categories in the institute as we derived the sample on the basis of PPS.

Most of our study participants belonged to the Upper socio-economic class (on BG Prasad scale). This is expected as the employees of the institute have a higher pay scale.

About 92.2% of the study participants in our study had not received any training regarding vaccines and immunization which represents a gap in this area. This was in accordance with the findings reported by Yassin ZJ et al. from Ethiopia where 66.8% of the healthcare professionals had not been trained on immunization (16).

Regarding the vaccination practices of our HCP, majority (91.8%) of them had received the last seasonal influenza vaccine and the most common reason given for receiving it was for self-protection (95.8%). In 8.2% of HCP who had not received the flu shot, the reason for not receiving in 97.2% was that people get flu despite vaccination. This was in accordance with the study conducted by Frenzel E et al. (17) where the uptake of last seasonal influenza vaccine was 94% and 87% respectively. Contrary to this, the uptake was low in a study by Cherif I et al (18) where in, it was 28.5% and 39.4% respectively. The reason of high uptake in our study could be the free availability of the vaccine in the hospital for all employees. However, Cherif I et al. (18) reported low uptake despite free availability which might reflect low vaccination confidence. The most common reason for refusal was fear of vaccine side-effects as reported by 31.1% and 48% of HCP in the studies conducted by Albano L et al. (19) and Cherif I et al. (18) respectively.

Regarding the practices of HCP, seasonal influenza vaccine uptake was not significantly associated with age, gender, residence, type of family, number of family members, department, years of service, training of employees and the vaccination confidence of the HCP. Similarly, age and gender were not found to be associated with uptake of influenza vaccine in a study conducted by Tagajdid R et al (20). In our study the uptake was higher among those with more duration of service (94.5%) than those with less experience (89.6%) but the association was not statistically significant. A statistically significant similar association between influenza vaccine uptake and duration of service was reported by Tuckerman JL et al. ( $p < 0.001$ ) (21). Training has also been significantly associated with vaccine uptake in the study conducted by Alshammari TM et al. ( $P < 0.001$ ) (22). No association of influenza vaccine uptake with overall vaccination confidence of HCP in our study is contrary to what is expected because confidence usually drives a person towards

taking a vaccine. Karlsson LC et al. (23) reported that high vaccination confidence among HCP was associated with increased seasonal influenza vaccine uptake.

In our study, higher uptake of influenza vaccine was seen in nursing personnel compared to other professional categories. Maltezou HC et al. (12) and Alshammari TM et al. (22) also found higher vaccine uptake among nurses compared to physicians and other medical professionals. Contrary to this, a study by Rachiotis G et al. (24) report higher vaccination uptake among physicians than other medical professionals. The influenza vaccine uptake was higher among the HCP from upper socioeconomic class compared to those from lower and middle class. This association although significant is not clearly understood as there is no out of pocket expenditure for influenza vaccine as it is given free in the institute.

The vaccine hesitancy in our study for seasonal influenza vaccine was 7.8%. A study by Loulergue P et al. (25) found it to be 30%.

There was no association of vaccine hesitancy towards influenza vaccine with general characteristics of the HCP except professional category and educational qualification. The reason for not finding an association may be a small hesitant group (n=35, 7.8%) versus non-hesitant group (n=415, 92.2%). Doctors were more hesitant than the rest of the HCP. A study conducted by Alshamari TM et al. (22) show more uptake of influenza vaccine among nurses than physicians. Contrary to our study Rachiotis G et al. (24) found more uptake of influenza vaccine in doctors. Our study did not find any association between vaccination confidence and influenza vaccine hesitancy although Karlsson LC et al. (23) found that the vaccination behaviour of HCP is affected positively by their vaccination confidence. The reason for the lack of this association in our study could be the small vaccine hesitant group in our study.

## CONCLUSION

The vaccination uptake of seasonal influenza vaccine was high in our study. To increase the uptake further among all healthcare workers, the healthcare workers need to be made aware of the fact that the vaccine is available free of cost to all healthcare workers wherever it is. At other places the vaccine needs to be made available free of cost. Since there is some vaccine hesitancy in the healthcare workers regarding seasonal influenza vaccine, regular awareness programs and trainings need to be given to healthcare workers to build the vaccination confidence.

### *Declaration by Authors*

**Ethical Approval:** Ethical clearance was obtained from the Institutional Ethics committee, SKIMS (IEC number: RP 65-B/2020). A written informed consent was taken from each participant.

**Acknowledgement:** None

**Source of Funding:** None

**Conflict of Interest:** There are no conflicts of interest

## REFERENCES

1. Almutairi LM, Almusawi MA, Albalawi AM, Abu Hassan MY, Alotaibi AF, Almutairi TM, Alalweet RM, Asiri AM. Knowledge, Attitudes, and Practices Regarding Influenza Vaccination Among Healthcare Workers in Saudi Arabia: A Cross-sectional Study. *J Prev Med Public Health*. 2024 Nov;57(6):586-594. doi: 10.3961/jpmph.24.283.
2. Deml MJ, Jafflin K, Merten S, Huber B, Buhl A, Frau E, Mettraux V, Sonderegger J, Kliem P, Cattalani R, Krüerke D, Pfeiffer C, Burton-Jeangros C, Tarr PE. Determinants of vaccine hesitancy in Switzerland: study protocol of a mixed-methods national research programme. *BMJ Open*. 2019 Nov 2;9(11): e032218. doi: 10.1136/bmjopen-2019-032218.
3. Barberis I, Myles P, Ault SK, Bragazzi NL, Martini M. History and evolution of influenza control through vaccination: from the first monovalent vaccine to universal vaccines. *J Prev Med Hyg*. 2016 Sep;57(3): E115-E120.

4. World Health Organization (WHO) Influenza (seasonal). Fact sheet November 2006. Available at [https://www.who.int/news-room/fact-sheets/detail/influenza-\(seasonal\)](https://www.who.int/news-room/fact-sheets/detail/influenza-(seasonal))
5. Lee N, Ison MG. Diagnosis, management and outcomes of adults hospitalized with influenza. *Antivir Ther.* 2012;17(1 Pt B):143-57. doi: 10.3851/IMP2059.
6. Paoli S, Lorini C, Puggelli F, Sala A, Grazzini M, Paolini D, Bonanni P, Bonaccorsi G. Assessing Vaccine Hesitancy among Healthcare Workers: A Cross-Sectional Study at an Italian Paediatric Hospital and the Development of a Healthcare Worker's Vaccination Compliance Index. *Vaccines (Basel).* 2019 Nov 29;7(4):201. doi: 10.3390/vaccines7040201.
7. Paterson P, Meurice F, Stanberry LR, Glismann S, Rosenthal SL, Larson HJ. Vaccine hesitancy and healthcare providers. *Vaccine.* 2016 Dec 20;34(52):6700-6706. doi: 10.1016/j.vaccine.2016.10.042.
8. Napolitano F, D'Alessandro A, Angelillo IF. Investigating Italian parents' vaccine hesitancy: A cross-sectional survey. *Hum Vaccin Immunother.* 2018 Jul 3;14(7):1558-1565. doi: 10.1080/21645515.2018.1463943.
9. Danchin MH, Costa-Pinto J, Attwell K, Willaby H, Wiley K, Hoq M, Leask J, Perrett KP, O'Keefe J, Giles ML, Marshall H. Vaccine decision-making begins in pregnancy: Correlation between vaccine concerns, intentions and maternal vaccination with subsequent childhood vaccine uptake. *Vaccine.* 2018 Oct 22;36(44):6473-6479. doi: 10.1016/j.vaccine.2017.08.003.
10. Bianco A, Pileggi C, Iozzo F, Nobile CG, Pavia M. Vaccination against human papilloma virus infection in male adolescents: knowledge, attitudes, and acceptability among parents in Italy. *Hum Vaccin Immunother.* 2014;10(9):2536-42. doi: 10.4161/21645515.2014.969614.
11. Song Y, Zhang T, Chen L, Yi B, Hao X, Zhou S, Zhang R, Greene C. Increasing seasonal influenza vaccination among high risk groups in China: Do community healthcare workers have a role to play? *Vaccine.* 2017 Jul 24;35(33):4060-4063. doi: 10.1016/j.vaccine.2017.06.054.
12. Maltezou HC, Katerelos P, Poufta S, Pavli A, Maragos A, Theodoridou M. Attitudes toward mandatory occupational vaccinations and vaccination coverage against vaccine-preventable diseases of health care workers in primary health care centers. *Am J Infect Control.* 2013 Jan;41(1):66-70. doi: 10.1016/j.ajic.2012.01.028.
13. Brandt C, Rabenau HF, Bornmann S, Gottschalk R, Wicker S. The impact of the 2009 influenza A(H1N1) pandemic on attitudes of healthcare workers toward seasonal influenza vaccination 2010/11. *Euro Surveill.* 2011 Apr 28;16(17):19854.
14. Rosemary J. Burnett, Guido François, M. Jeffrey Mphahlele, John G. Mureithi, Patricia N. Africa, Mpho M. Satekge, D. Maggie Mokonoto, André Meheus, Marc van Sprundel. Hepatitis B vaccination coverage in healthcare workers in Gauteng Province, South Africa. *Vaccine.* 2011; 29 :4293–4297. <https://doi.org/10.1016/j.vaccine.2011.03.001>
15. Pulcini C, Massin S, Launay O, Verger P. Knowledge, attitudes, beliefs and practices of general practitioners towards measles and MMR vaccination in southeastern France in 2012. *Clin Microbiol Infect.* 2014 Jan;20(1):38-43. doi: 10.1111/1469-0691.12194.
16. Yassin ZJ, Yimer Nega H, Derseh BT, Sisay Yehuala Y, Dad AF. Knowledge of Health Professionals on Cold Chain Management and Associated Factors in Ezha District, Gurage Zone, Ethiopia. *Scientifica (Cairo).* 2019 Jun 9; 2019:6937291. doi: 10.1155/2019/6937291.
17. Frenzel E, Chemaly RF, Ariza-Heredia E, Jiang Y, Shah DP, Thomas G, Graviss L, Raad I. Association of increased influenza vaccination in health care workers with a reduction in nosocomial influenza infections in cancer patients. *Am J Infect Control.* 2016 Sep 1;44(9):1016-21. doi: 10.1016/j.ajic.2016.03.024.
18. Cherif I, Kharroubi G, Bouabid L, Gharbi A, Boukthir A, Ben Alaya N, Ben Salah A, Bettaieb J. Knowledge, attitudes and uptake related to influenza vaccine among healthcare workers during the 2018-2019 influenza season in Tunisia. *BMC Public Health.* 2021 May 13;21(1):907. doi: 10.1186/s12889-021-10970-y.
19. Albano L, Matuozzo A, Marinelli P, Di

- Giuseppe G. Knowledge, attitudes and behaviour of hospital health-care workers regarding influenza A/H1N1: a cross sectional survey. *BMC Infect Dis.* 2014 Apr 16;14:208. doi: 10.1186/1471-2334-14-208.
20. Tagajdid R, El Annaz H, Doblali T, Sefiani K, Belfquih B, Mrani S. Healthcare worker acceptance of pandemic (H1N1) 2009 vaccination, Morocco. *Emerg Infect Dis.* 2010 Oct;16(10):1638-9. doi: 10.3201/eid1610.100984.
21. Tuckerman JL, Collins JE, Marshall HS. Factors affecting uptake of recommended immunizations among health care workers in South Australia. *Hum Vaccin Immunother.* 2015;11(3):704-12. doi: 10.1080/21645515.2015.1008886.
22. Alshammari TM, Yusuff KB, Aziz MM, Subaie GM. Healthcare professionals' knowledge, attitude and acceptance of influenza vaccination in Saudi Arabia: a multicenter cross-sectional study. *BMC Health Serv Res.* 2019 Apr 15;19(1):229. doi: 10.1186/s12913-019-4054-9.
23. Karlsson LC, Lewandowsky S, Antfolk J, Salo P, Lindfelt M, Oksanen T, Kivimäki M, Soveri A. The association between vaccination confidence, vaccination behavior, and willingness to recommend vaccines among Finnish healthcare workers. *PLoS One.* 2019 Oct 31;14(10): e0224330. doi: 10.1371/journal.pone.0224330.
24. Papagiannis D, Rachiotis G, Symvoulakis EK, Daponte A, Grivea IN, Syrogiannopoulos GA, Hadjichristodoulou C. Vaccination against human papillomavirus among 865 female students from the health professions in central Greece: a questionnaire-based cross-sectional study. *J Multidiscip Healthc.* 2013 Nov 28; 6:435-9. doi: 10.2147/JMDH.S49558.
25. Loulergue P, Moulin F, Vidal-Trecañ G, Absi Z, Demontpion C, Menager C, Gorodetsky M, Gendrel D, Guillevin L, Launay O. Knowledge, attitudes and vaccination coverage of healthcare workers regarding occupational vaccinations. *Vaccine.* 2009 Jun 24;27(31):4240-3. doi: 10.1016/j.vaccine.2009.03.039.

How to cite this article: Basina Gulzar, Syed Najmul Ain. Vaccination practices regarding seasonal influenza vaccine among healthcare workers of a tertiary care hospital in Kashmir: A cross-sectional study. *Int J Health Sci Res.* 2026; 16(5):9-18. DOI: [10.52403/ijhsr.20260502](https://doi.org/10.52403/ijhsr.20260502)

\*\*\*\*\*