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KNOWLEDGE, PRACTICES AND OUTCOMES OF PREVENTIVE VACCINATION IN PATIENTS ON IMMUNOSUPPRESSIVE THERAPIES IN A HEALTHCARE FACILITY OF PAKISTAN: A CROSS SECTIONAL STUDY

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Abstract

Introduction: Patients on immunosuppressive therapies are generally considered at high risk for acquiring certain common infections.

Objectives: To determine the extent of awareness among the patients and the healthcare workers of the importance of preventive immunization and the effect and outcome of such immunization in patients on immunosuppressive therapies suffering from both autoimmune rheumatic inflammatory diseases and oncological diseases.

Materials and methods: This Cross-Sectional Study was conducted in both the indoor and outpatient departments of Pakistan Institute of Medical Sciences Islamabad. The study was conducted between March 2020 and December 2020. The data was collected through non probability consecutive sampling technique.

Results: The data was collected from 300 patients. Mean age of the participants was 39.69± 15.86 years. The results shows that 66 (34.9%) patients suffering from rheumatic disorders and 66 (58.92%) patients suffering from oncological disorders were aware of the importance of preventive immunization due to their immunosuppressed condition. The awareness for the need for vaccination was mostly conveyed to the patients by the health workers. This awareness was however different in case of COVID-19, which the patients already new from their own knowledge from the public awareness campaign by the media. All the aware patients got vaccinated whereas the unaware patients remained without vaccination. In case of Covid-19 where 73.6% (220) who got the vaccination only 4.1% (9) got infected (p-value <.001). Whereas in case of under diseases evaluated, namely Hepatitis B, Herpes Zoster, Pneumococcus, Influenza, where on an average, 51.67% (156) patients were vaccinated. Here only 7.6% (11) caught the infection as opposed to 38 (34.9%) who caught it out of the remaining 48|% (144) who were not vaccinated (p-value <.001). The results show that In case of Covid-19 where 73.6% (220) who got the vaccination only 4.1% (9) got infected (p-value <.001). Whereas in case of under diseases evaluated, where on an average,

51.67% (156) patients were vaccinated. Here only 7.6% (11) caught the infection as opposed to 38 (34.9%) who caught it out of the remaining 48|% (144) who were not vaccinated (p-value <.001).
Conclusion: Prior knowledge of the importance, and implementation of practice of vaccination against common infections in immune-compromised individuals show a satisfactory outcome. Vaccination are safe and reduces the possibility of acquiring these potential infections. Steps need to be taken to increase the awareness of the importance of vaccinations both in the patients and healthcare workers. The concerned authorities need to ensure the availability of these vaccines in the market and on prices which are affordable.

Introduction

Patients on immunosuppressive therapies are generally considered at a higher risk for acquiring certain common infections like Influenza, pneumococcal, herpes zoster, HPV and SARS-CoV2. Such patients have weakened immune systems either because of their chronic illness or because of therapies which depress immunity. Consequently, they are more susceptible to infection which in turn is associated with increased morbidity, mortality, and cost of care (1). To improve their outcome, vaccination against common pathogens is a key strategy which is recommended by major guidelines (2). Despite these recommendations, preventive vaccination among patients is low (3). Concerns about vaccine-related relapse of inflammatory rheumatic diseases and post-vaccination allograft rejection also exist; however these appear uncommon (4, 5, 6, 7). Generally it is recommended that vaccinations should not be withheld on these basis alone (8).

Over the past decades, the number of immune-compromised patients have increased because of newer therapies in both rheumatology and oncology. These include newer anti-cancer regimes, monoclonal antibodies, more targeted therapies and other modalities like haematopoietic allogeneic stem cell transplantation with varying mechanism of actions and their interaction with these vaccines need investigating (9). Another area of concern is the fact that the immune-compromised individuals may respond inadequately to vaccinations compared to others which needs investigating (10). Vaccines are extremely effective and generally considered safe. Their regular use has not only reduced the incidence of infections, but also a reduced the mortality and morbidity related to them. Vaccines were usually obtained from weakened or killed forms of the microbe, or their toxins, or their surface proteins (11). With the emergence of SARS-CoV2 pandemic, newer forms like the mRNA vaccines or the virus-vectored vaccines have been developed (12). With all these concerns, this study analyzes the existing situation and resultant impact on the patients' health in our society.

Objectives

To determine the extent of awareness among the patients and healthcare workers of the importance of preventive immunization and the effect and outcome of such immunization in patients on immunosuppressive therapies suffering from both autoimmune rheumatic inflammatory diseases and oncological diseases

Materials and methods

This Cross Sectional Retrospective Study was conducted at in/out patient departments of Pakistan Institute of Medical Sciences Islamabad. The study was done during March 2020 till December 2020. The data was collected through non probability consecutive sampling technique.

Inclusion Criteria:

Age ≥18 years having either gender

Diagnosed cases of autoimmune inflammatory rheumatic disease and oncological diseases who are willing to participate in the study

Exclusion Criteria

Patients who decline to consent to the study

Data Collection Procedure

All patients fulfilling the inclusion criteria was enrolled for study. The importance and purpose of the study was explained to the participants. After verbal consent, the patients were asked to answer simple questions which was read out from the questionnaires' prepared. The questionnaires' are attached and are self-explanatory. Questionnaire A, B and C. It contains basic patient information including the disease entity, duration and the medications used in the past and the ones currently being used. They were also asked about whether they have been vaccinated against the four diseases under consideration namely: Seasonal flu, hepatitis b, pneumococcal pneumonia, herpes zoster or any other significant illness of mention. They were also asked whether they already knew about the significance of these vaccinations in their cases or were they informed about it by the healthcare worker. They were also asked if they had suffered from these illnesses, whether before or after the vaccination was given if any. The response was recorded on the individual Performa.

Data was collected and analyzed using SPSS version 24. Groups were compared using chi square-test. P-value of ≤ 0.05 is considered significant.

Results

The data was collected from 301 patients. Mean age of the participants was 39.69± 15.86 years. Out of the 189 (63%) Rheumatic patients 95 (50%) were males and 93 (50%) were female were as out of oncology 112 (37%) patients, 57 (50%) were males and 55(50%) females. The total number of people vaccinated were 45(23.8%) rheumatic and 61(54.46%) oncology patients. The details of comorbid ailments among the total patients was as followings:

Comorbids	Rheumatic patients	Oncology Patients
Hypertension	145	21
Diabetes Mellitus	15	9
Chronic airway disease	24	9

Breakdown of the rheumatic and the oncology disorders was as follows:

Rheumatic disorders			
Disorder	**Number of patients**	**Disorder**	**Number of patients**
RA	39	SLE with Nephritis	3
Spondyloarthropathy	21	SLE without Nephritis	18
Polymyalgia Rheumatica	3	Granulomatosis with polyangiitis	9
Systemic sclerosis	9	Juvenile idiopathic arthritis	9
Osteoarthritis	12	Mix connective tissue disease	8
Inflammatory bowel disease associated	6	Soft tissue rheumatism	3
Psoriatic arthropathry	6	Pachymeningitis with optic neuritis	1

Oncology disorders			
Disorder	**Number of patients**	**Disorder**	**Number of patients**
Hematological	63	Squamous cell Carcinoma	3
Carcinoma Breast	9	Ewing sarcoma	2
Lymphoma	18	Carcinoma Esophagus	4
Gastrointestinal stromal tumor	3	Carcinoma Colon	2
Carcinoma Pancreas	3	Adenocarcinoma – unknown primary	3
Unknown Metastatic disease	3		
Ovarian Carcinoma	4		

They were on the following medications:
Medications:

Drug	**Rheumatic disorders**	**Oncological disorders**
Steroids	78	60
Methotrexate	45	
Leflunomide	15	
Sulphasalazine	15	
Myocophenolate	12	
Hydroxychloroquine	18	
Cyclophosphamide	12	
Eternacept	6	
Oncology chemotherapy		78

It became apparent that the awareness about the need for vaccination among the patients was more for Covid-19 vaccination, 73.6% (220) as opposed to other diseases including Seasonal flu, hepatitis b, pneumococcal pneumonia, herpes zoster, which was 51.67% (156). The awareness for the need for vaccination was mostly conveyed to the patients by the health workers (78%). This awareness was however different in case of COVID-19 (99.9%), which the patients already new from their own knowledge from the public awareness campaign by the media. This awareness helped them get the vaccination which prevented the disease in most of the cases. In case of Covid-19 where 73.6% (220) who got the vaccination only 4.1% (9) got infected (p-value <.001). Whereas in case of under diseases evaluated, where on an average, 51.67% (156) patients were vaccinated. Here only 7.6% (11) caught the infection as opposed to 38 (34.9%) who caught it out of the remaining 48|% (144) who were not vaccinated (p-value <.001).

Table 1: Patient awareness vs. disease event

Disease	Awareness for the need for vaccine in their case			Not aware for the importance of vaccination	Disease in aware patients	Diseased in non-aware patients	p-value
	On her/ his own or other means	Given by Healthcare worker	Total Awareness Patient + Healthcare worker				
Hepatitis B	51	105	52% (156)	48% (144)	6.4% (10)	32.0% (46)	<.001
Herpes zoster	21	101	40% (122)	59%(178)	6.6% (8)	33.6% (41)	<.001
Pneumococcal	21	200	73.7% (221)	26.3% (79)	4.5% (10)	13.1% (29)	<.001
Influenza	45	78	41% (123)	59% (177)	13.0%(16)	60.9% (75)	<.001
Overall result of above	22%(34)	78%(121)	51.67%(156)	48%(144)	7.6%(11)	34.9%(38)	<.001
Covid-19	219	1	73.6% (220)	26.3% (7)	5.5% (12)	30.5% (67)	<.001

Table 2: Overall disease event vs. vaccination status

Disease	Vaccinated	Non vaccinated	Disease free	Diseased	p-value
Hepatitis B, Herpes zoster Pneumococcal Pneumonia Influenza	51.67% (156)	48.0% (145)	6.27% (10)	34.87% (49)	<.001
Covid-19	73.6% (220)	26.3% (7)	4.1% (9)	88.6% (70)	<.001

Table 3: Individual disease event vs. vaccination status

Disease	**Vaccination status**		**Event of disease**		**p-value**
	Vaccinated	Not vaccinated	Vaccinated	Not vaccinated	
Hepatitis B	52% (156)	48|% (144)	6.4% (10)	32.0% (46)	<.001
Herpes zoster	40% (122)	59%(178)	5.7% (7)	23.6% (42)	<.001
Pneumococcal Pneumonia	73.7% (221)	26.3% (79)	4.1% (9)	38.7% (30)	<.001
Influenza	41% (121)	59% (177)	8.9% (11)	45.2% (80)	<.001
Covid-19	73.6% (220)	26.3% (7)	4.1% (9)	88.6% (70)	<.001

Discussion

Patients on immunosuppressive therapies are generally at a higher risk for acquiring infections. For this reason the prevention of infections is essential in these type of patients [13]. Introduction of vaccines is a major achievement in medicine which allow protection against many potentially fatal infections, thus decreasing mortality worldwide. However, achieving a sufficient vaccine coverage of the international population still remains a challenge [14]. A major concern exists that vaccinations may sometimes cause an exacerbation of the pre-existing autoimmune disease. Limited data exists regarding the possibility of vaccine-associated disease exacerbations [15]. In several published case reports and series, there seems to be no increase in the incidence or exacerbation of HPV in patients with SLE vaccinated against it. Similarly, there was no exacerbation noted in patients with multiple sclerosis when vaccinated against hepatitis B, tetanus, or influenza [16]. Comparing the risk against possible benefit, the recommendation is in favor of vaccination in patients with autoimmune and other immunosuppressed conditions.

Our study throws some light on the current awareness trends regarding immunization in immune-compromised patients in our setup. It is evident that the awareness of vaccination against COVID-19 was high compared to other diseases under consideration. One basic reason being that COVID-19 appeared as an epidemic, with lots of publicity compared to the other disorders studied. COVID-19 was taken very seriously and the vaccination carried out in a robust manner, both locally and abroad. Another unfortunate reason which was noted was that, the health professionals were not conveying this information properly to the patients. The reason given by them was that they were not aware of the availability of these vaccines in the local market. Besides, even if they were aware, the availability of these vaccines in the market was erratic or they were too expensive for the already overburdened patients to afford them. This aspect has also been highlighted in another study by Jiang et al. (17) who concluded that 3% of patients never got vaccinated because the vaccine was too expensive. However our study has clearly shown the benefit of immunization against all the diseases evaluated in these high risk individuals compared to the non-immunized. Despite the added benefit of reduction in the incidence of the diseases, these vaccines were not associated with any additional risk of side effects, at least in the short period evaluated.

In light of the observations highlighted, we suggest that awareness of vaccination in immune-compromised patients should be publically highlighted. Secondly, the health professionals should regularly undergo refresher courses to keep them abreast with the need and the availability of these vaccines in the market. Involving the General Physicians in highlighting the benefit of vaccinations will also be helpful as shown in other studies [18]. Since these vaccines are expensive, and presently the patient has to buy them, their prices should be subsidized by the relevant organizations. This will promote health, reduction of potentially avoidable diseases and resultant increased morbidity and mortality in these individuals. This in turn will also reduce the financial and administrative burden on the health workers and the health authorities.

Conclusion

Prior knowledge of the importance, and implementation of practice of vaccination against common infections in immune-compromised individuals show a satisfactory outcome. Vaccination are safe and reduces the possibility of acquiring these potential infections. Steps need to be taken to increase the awareness of the importance of vaccinations both in the patients and healthcare workers. The concerned authorities need to ensure the availability of these vaccines in the market and on prices which are affordable.

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