

Factors influencing vaccination status against influenza and pneumococcus in sickle cell anemia patients

Asli Korur¹, Suheyl Asma¹, Cigdem Gereklioglu², Can Boga³, Hakan Ozdogu³

¹Department of Family Medicine, Faculty of Medicine, Baskent University, Ankara, Turkey

²Department of Family Medicine, Faculty of Medicine, Cukurova University, Adana, Turkey

³Department of Hematology, Faculty of Medicine, Baskent University, Ankara, Turkey

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Abstract

Aim: The aim of the present study is to investigate the factors which influence vaccination status against seasonal influenza and pneumococcus in patients with sickle cell anemia which is known to be the most common hereditary hematologic disease worldwide.

Materials and Methods: This prospective, cross-sectional study was conducted with the volunteer patients above 18 years who were admitted to Hematology Clinic of Baskent University Adana Research and Training Center due to sickle cell anemia during 01 December – 31 December 2018.

Results: Of 38 patients, 22 (57.9%) were females. Ratio of vaccination against pneumococcus was found to be higher among the patients who had vaccination cards ($p<0.05$). Ratio of vaccination against pneumococcus and influenza was found to be higher among the patients who were coming for regular controls and the difference was statistically significant ($p<0.05$). The reason for not getting vaccinated was detected to be “forgetting vaccination” (37.5%), “not believing the necessity of vaccination” (25%) and “not being recommended by health authorities” (25%).

Conclusion: It was concluded that vaccination rates could be increased through using vaccination cards, inviting the patients for regular controls and health authorities’ recommending vaccination.

Keywords: Influenza; pneumococcus; sickle cell anemia; vaccination

INTRODUCTION

Sickle cell anemia (SCA) which is characterized by painful crises, chronic hemolysis episodes and organ damage resulting from abnormal hemoglobin S (HbS) production is among the most common genetic disorders worldwide. About 5 million individuals are affected by abnormal sickle cell gene, 100.000 Afro-American SCA patients live in America and more than 100.000 children are born with SCA every year in United Kingdom and France (1). Ratio of HbS carriers reaches 30% in Eastern Mediterranean Region of Turkey and approximately 1500 patients are known to have SCA in our country. Mean lifetime of SCA patients is 39 years (2) and it is reported to be 36.6 years in Eastern Mediterranean Region. Acute chest syndrome and multi-organ failure are among the most important causes of mortality (3). Viral infections, mycoplasma and encapsulated microorganisms lead to typical vaso-occlusive episodes. Acute chest syndrome characterized by fever, chest pain and pulmonary infiltrates is among the most threatening complications (4,5). Age of mortality and tissue damage development is known to be postponed to

adulthood through vaccination against seasonal influenza and pneumococcus infections (4,6-8).

In literature, most of the studies investigating vaccinations in SCA patients are conducted with pediatric patients. In the present study, we aimed to investigate vaccination status of adult SCA patients against influenza and pneumococcus and influencing factors.

MATERIALS and METHODS

This prospective cross-sectional study was conducted with 38 adult SCA patients among 210 who were registered to Sickle Cell Anemia Unit of Hematology Department, Baskent University between 1 and 31 December 2018. Written informed consent was obtained from the patients prior to the study. Ethics committee approval was obtained from Ethics Committee of Medical and Health Sciences of Baskent University (KA:18/370).

A questionnaire form developed by the researchers and including 20 questions about demographic characteristics, knowledge, attitudes and behaviors of the patients was used for data collection.

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Corresponding Author: Asli Korur, Department of Family Medicine, Faculty of Medicine, Baskent University, Ankara, Turkey

E-mail: aslipan@yahoo.com

Statistical analysis

Statistical Package for Social Sciences ver. 17.0 (SPSS 17.0) was used for statistical analyses. Categorical measurements are summarized as number and percent, chi-square and Fisher's exact test were used for comparison of categorical variables. A p level of <0.05 was accepted as statistically significant.

RESULTS

Mean age of the patients was 31.3±7.03 years (18-48), 22 (57.9%) were females and 26 (68.4%) patients were graduates of high school and university. While 25 patients (60.5%) experienced 2 or less crises each year, 15 patients (39.5%) were found to experience 3 or more crises. Number of the patients who come for regular follow-ups was 28 (73.7%). Ratio of vaccination against influenza and pneumococcus was found to be higher among the patients who came for controls with 3-6 months of interval (regular follow-up) as compared to the patients who did not come for regular follow-ups and the difference was statistically significant ($p<0.05$). Ratio of vaccination against pneumococcus was seen to be higher among the patients who had a vaccination card ($p<0.05$).

A statistically significant association was not found between vaccination rates and gender, education status, number of crises yearly and being followed-up at the same center (Table 1).

When knowledge level of the patients about vaccines was evaluated, ratio of vaccination against influenza A was found to be 61.3% although 86,4% of them reported that they knew that they should be vaccinated against seasonal influenza A every year however a statistically significant difference was not found between vaccination rates and knowledge level ($p>0.05$). Ratio of regular vaccination against pneumococcus was found to be 67.7% and ratio of knowing that they should be vaccinated against pneumococcus was 81.6% and the difference between vaccination rate and knowledge level was statistically significant ($p<0.05$). Of the patients, 70.9% were informed about that they should be vaccinated regularly every year by the physicians by whom they were being followed-up.

When causes of not being vaccinated against influenza was evaluated in 16 patients; 6 (37.5%) patients stated that they forgot, 4(25%) stated that they did not believe that it was necessary, 4 (25%) stated that their physician did not recommend, 2 (12.5%) due to side effects and 2 (12.5%) due to other reasons.

When causes of not being vaccinated against pneumococcus was evaluated in 14 patients, 7 (18.4%) patients stated that their physician did not recommend, 2 (5.3%) patients stated that they did not believe that it was necessary, 2 (5.3%) stated that they forgot and 3 (7.9%) patients due to other reasons.

Table 1. Factors influencing vaccination status against influenza and pneumococcus

	Influenza vaccination		P	Pneumococcus vaccination		P
	Yes n (%)	No n (%)		Yes n (%)	No n (%)	
Gender						
Female	18 (58.1)	4 (57.1)	1	12 (57.1)	10 (58.8)	1
Male	13 (41.9)	3 (42.9)		9 (42.9)	7 (41.2)	
Education Status						
Primary education	8 (25.8)	4 (57.1)	0.176	5 (23.8)	7 (41.2)	0.307
High school-University	23 (74.2)	3 (42.9)		16 (76.2)	10 (58.8)	
Crises / year						
≤ 2	18 (58.1)	5 (71.4)	0.681	15 (74.4)	8 (47.1)	0.185
≥3	13 (41.9)	2 (28.6)		6 (28.6)	9 (52.9)	
Vaccination card						
Yes	9 (29)	0 (0)	0.164	8 (38.1)	1 (5.9)	0.026
No	22 (71)	7 (100)		13 (61.9)	16 (94.1)	
Following-up at the same center						
Yes	24 (77.4)	5 (71.4)	1	17 (81)	12 (70.6)	0.703
No	7 (22.6)	2 (28.6)		4 (19)	5(29.4)	
Regular follow-up						
Yes	23 (74.2)	2 (28.6)	0.034	17 (81)	8 (47.1)	0.042
No	8 (25.8)	5 (71.4)		4 (19)	9 (52.9)	

Thirty seven (97.3%) patients stated that they would be vaccinated if health authorities recommend, 36 (94.7%) if they would be informed sufficiently and 29 (76.3%) if vaccines would be obtained free of charge.

DISCUSSION

It is of vital importance for SCA patients to be vaccinated against common infections as they are susceptible to microorganisms including *S. pneumonia*, meningococcus, non-typhi *Salmonella*, seasonal influenza and *Haemophilus influenzae* type B (9). Conjugated pneumococcus vaccine was shown to reduce invasive pneumococcal disease 90.8% in children with SCA under two years and 93.4% under 5 years (10). In the study of Gomer et al. conducted with children with SCA, a significant and reverse association was found between hospitalization rates due to pneumococcus and influenza-related pneumonia, and vaccination rates against these diseases (11).

Both community-acquired and health care-related infections are observed in SCA patients resulting in increased respiratory failure, intensive care unit stay and death risk (12).

Although pneumococcus and influenza vaccines are among the most commonly used vaccines in adulthood and they were found to be effective and safe in SCA patients, vaccination rates were not found to be sufficiently high in general population and in this patient group (9,13,14).

When the association between having a vaccination card and vaccination against influenza and pneumococcus was analyzed, a positive association was found with vaccination against pneumococcus. In a previous study investigating the effect of electronic health records on vaccination rates, we detected that 21.5% of 93 SCA patients were getting vaccinated against pneumococcus regularly and 21.5% were found that they were getting vaccinated against influenza regularly; these ratios were found to elevate to 50.8% for pneumococcus and 49.2% for influenza through regular follow-ups and electronic health records (9). In the study of Gorham et al., compliance to vaccination schedules was found to be low in SCA patients 16 years and above, these ratios were found to increase through audits, but not sufficient and the importance of national vaccination policies was emphasized (15).

When evaluated historically, responsibility of SCA patients is seen to be in hematology centers as it is a hematologic disease. The whole family is influenced in SCA which is a congenital and chronic disease and the disease should be understood better not only by the hematologists but also by other health care providers who serve for these patients. Because SCA which is a benign disease acts as a malignant disease due to its complications and the absence of a curative treatment modality except allogeneic stem cell transplantation, and thereby it concerns all health care services (3,11,16,17).

In the present study, ratio of vaccination against influenza and pneumococcus was found to be higher among the

patients who came for regular controls in the context of continuity of care and the association was found to be statistically significant. In the context of comprehensive care, one of the core competencies of family medicine, family physicians are responsible for promotion of health and wellness of their patients, and also management of acute and chronic problems concurrently. Therefore follow-up of vaccination status of SCA patients, providing information about the disease and promotion of vaccination are among the responsibilities of family physicians. If SCA patients are being followed up at a sickle cell unit, their vaccinations are done at those centers, family physicians can contribute to increase vaccination rates through monitoring their patients for going to regular follow-ups and getting vaccinated, providing information about the importance of vaccines and controlling them. Besides, family physicians should have information about general health status of SCA patients and the complications they experience as they are at the first contact point and they should provide care for all health problems in the context of primary care management core competency of family medicine, they should refer the patients to the secondary or tertiary institutions when required, ask consultation and follow-up in the context of coordination and advocacy core competency (18).

Influenza vaccine is recommended for risky populations by The Ministry of Health and there are many factors that influence vaccination (13,19,20). The vaccine's being required every year, cost of the vaccine and health authorities' not recommending the vaccine are some of the reasons for not getting vaccinated (21).

In the study of Hambidge et al. investigating the records in Vaccine Safety Database of SCA patients between 1991 and 2006, and hospitalization rates among the patients who got vaccinated with trivalent inactivated influenza vaccine, the authors did not find an association between vaccination and hospitalization due to crises and stated that the vaccine was safe, and also recommended the vaccine in this patients group (22).

Vaccination rate against influenza is known to be low among risky health care professionals and that they do not recommend the vaccine to the patients (21,23). In our study, the most important factors that influence vaccination against influenza were found to be forgetting vaccination, not providing sufficient information to the patients, physicians' not recommending the vaccine and side effects.

LIMITATIONS

The SCA patients who were admitted to the hospital during the study period among 200 registered were included in the study. So the results of the study cannot be generalized to the whole population and it was planned to conduct a study with the whole patients registered to our center in a longer time period considering the follow-up intervals.

CONCLUSION

Viral and bacterial infections are important causes of mortality and morbidity in SCA patients. We consider that vaccination rates could be increased through electronic health records, regular follow-up of the patients, giving vaccination cards to the patients, providing sufficient information about the vaccines and recommending the vaccines. Although the care of SCA patients are under the responsibility of primary, secondary and tertiary health care services, it is possible to improve quality of life of the patients and to reduce morbidity and mortality in the context of comprehensive care and holistic approach core competencies of family medicine.

Conflict of interest : The authors declare that they have no competing interest.

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