

ORIGINAL ARTICLE

Prevalence and knowledge of extra vaccines among sickle cell anemia patients in Jazan, Saudi Arabia

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ABSTRACT

Background: Sickle cell anemia (SCA) is an autosomal illness characterized by a defect in the normal shape of red blood cells leading to lower efficiency in oxygen delivery. Patients suffering from SCA are more prone to infection, so they must be vaccinated against several infectious diseases. The present study aimed at assessing the prevalence and knowledge of extra vaccines among SCA patients in Jazan, Saudi Arabia.

Methodology: A cross-sectional study that lasted for 3 months was conducted in Jazan, Saudi Arabia, among patients with sickle cell anemia. The collection of data was done through a structured self-administrated survey.

Results: Among 150 SCA patients, 54.5% were male, 69.3% had a family history of SCA, and 51.7% had administered additional vaccines. The overall knowledge was high among 30% and was low among 70%. The knowledge level was dependent on the employment status ($p = 0.01$) and administration of additional vaccines ($p = 0.0001$).

Conclusion: There was a low level of knowledge among SCA patients regarding additional vaccines. A few factors were identified as determinants of the knowledge level.

Keywords: SCA, prevalence, knowledge, vaccines, Jazan.

Introduction

Sickle cell anemia (SCA) is considered as one of the most common inherited blood disorders that increases the mortality and morbidity rates worldwide [1]. SCA is severe anemia caused due to a mutation to the hemoglobin gene that results in modified sickle-shaped red blood cells [2]. The red blood cells are modified from the smooth shape into a crescent shape lacking plasticity [3], so small blood capillaries might block small blood vessels and impaired/reduced blood and oxygen flow into the body organs, which is called vaso-occlusion [4]. This will decrease the survival of red blood cells [3]. SCA complications include chest syndrome, renal failure, and pulmonary hypertension, which are considered the most severe complications that increase the mortality rate [5]. Also, splenic infarction, joints' necrosis, pain episodes, and leg ulcers are some of the SCA complications [1]. The SCA patients need blood transfusion and repeated hospitalization because of the risk of the associated complications [6]. In Saudi Arabia, the prevalence of SCA is high and is considered to have the highest prevalence recorded in the southwestern

(Jazan and Qunfudah) and eastern (Al-Ahsa) [7] regions. SCA might adversely affect the healthcare burden if left untreated and recognized globally as a chronic disease that negatively impacts the economic and social side [8]. Vaccination is one of the standard methods to prevent and reduce infection [9]. Increasing the knowledge of SCA populations and their associated complications decreases the disease's burden on the family and society by providing health education programs [10]. Therefore, the current study aims to assess the prevalence and knowledge of extra vaccines among SCA patients in Jazan, Saudi Arabia. Many studies investigated the

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patients'/populations' knowledge of SCA prevalence and its associated complications in Saudi Arabia. To the best of our knowledge, few studies investigated the prevalence and understanding of extra vaccines among SCA patients in Jazan, Saudi Arabia. This study aims to assess the prevalence and knowledge of extra vaccines among SCA patients in Jazan, Saudi Arabia. The study's objectives are to assess the prevalence and knowledge of extra vaccines among SCA patients in Jazan, Saudi Arabia; to assess the association between patients' demographic data and their knowledge level; to determine the most complications associated with SCA; and to determine the most common vaccine used among SCA patients in Jazan. Kotb et al. [3] conducted a cross-sectional study in Jazan, Saudi Arabia, to assess Saudi males' knowledge, attitude, and practices. Most of the participants showed an intermediate level of SCA knowledge, while 17.4% showed poor knowledge. Friend and neighbors were the most sources of SCA knowledge. A higher level of SCA knowledge was found among male participants with at-risk marriages than those with safe marriages. On the contrary, Isah et al. [11] reported a high knowledge (97.6%) toward SCA.

Another previous study [6] was carried out in Jazan, Saudi Arabia, to assess the effect of health education program on the knowledge and attitude of the secondary school students toward SCA. Approximately 6.7% of the participants had SCA, and most of them did not know about SCA. A significant increase in their knowledge level toward SCA was reported after the health education program. These results agreed with Ibrahim et al. [12], who reported a marked increase in the students' level in Jeddah, Saudi Arabia. A previous study in Lagos state, Nigeria [8] showed a low level of knowledge toward SCA (25%). In comparison, a significant increase in the knowledge level (64.1%) and a positive attitude was shown after the education program's intervention. Alkot et al. [13] carried out a study in Makkah city to assess the prevalence of SCA complications among children. The most prevalent difficulty (55.9%) was a vaso-occlusive crisis, followed by infection (9%). Other complications were also reported, such as acute chest syndrome and acute splenic sequestration crisis (6.2%), hemolytic crisis (3.4%), and 3.1% of the Saudi patients showed acute splenic sequestration crisis. Using penicillin prophylaxis at the first of the newborn period could prevent these complications. Al Meslet et al. [14] conducted a study in Jeddah, Saudi Arabia, to evaluate the knowledge, attitudes, and awareness of dental students in Riyadh Elm University toward SCA. The participants showed a satisfactory level of knowledge. More than half (52.4%) gave prophylactic antibiotics to the SCA patients before extraction, and 28.1% showed that paracetamol was the best pain killer for SCA.

Subjects and Methods

A cross-sectional study was conducted among Saudi sickle cell anemia patients (male and female) aged >18

years. The analysis was carried out using a structured self-administered questionnaire developed using SurveyMonkey.com; they were sent electronically. After the Institutional Review Board approved the study, the participants were asked to sign the consent on the first page of the questionnaire. The questionnaire included questions about demographic characteristics (age, gender, marital status, educational level, occupational and economic status, and SCA family history). The questionnaire included questions regarding SCA patients' level of knowledge and the prevalence of different vaccines. Confidentiality was assured to all participants who agreed to participate in the study. The privacy and confidentiality of the data and study results were secure by restricting unauthorized access. The respondents were given a brief description of the study and its objectives, and written consent was obtained from every participant in this study. Data were analyzed using Statistical Package for the Social Sciences, version 20 (IBM, Armonk, NY). Numbers and percentages were used to represent all categorical variables. A *p*-value lower than 0.05 was considered significant.

Results

A total of 150 SCA patients responded to our online self-administered questionnaire. The patients had a mean age of 25.4 ± 6.7 SD years, ranging from 6 to 46 years. Male patients (79, 54.5%) were more predominant than female patients (66, 45.5%). Most of the patients were married (104, 70.3%), unemployed (105, 70%), and with middle education (99, 66%). More than half (104, 69.3%) reported a family history of SCA, and almost one-half administered additional vaccines (77, 51.7%); demographic characteristics of patients are shown in Table 1.

The knowledge questions and answers are shown in detail in Table 2; 61 (41.8%) thought additional vaccines do not cause any harm and do not cause any side effects. More than one-half (79, 54.1%) reported additional vaccines are essential for patients with SCA. A few percent thought that SCA patients could receive more than one vaccine at once. Less than one-half said that doctors advised the SCA patients to receive additional vaccines. 58 (40.3%) mentioned that vaccinated individuals could protect others from contagious diseases, and 52 (35.6%) stated that escaping the vaccines can harm the surrounding population.

The overall knowledge was high among 45 (30%) and was low among 105 (70%) participants, Figure 1. The correlations between the overall expertise and different variables are shown in Table 3. Each gender ($p = 0.25$), marital state ($p = 0.45$), education level ($p = 0.5$), and family history of SCA ($p = 0.93$) had no impact on the level of knowledge of the patients. On the contrary, employment status ($p = 0.01$) and the state of administering additional vaccines ($p = 0.0001$) had a significant influence on patients' level of knowledge. The mean age had no significant impact ($p = 0.93$) on the

Table 1. Demographic characteristics of the patients.

Variables		Count	Column %
Gender	Male	79	54.5
	Female	66	45.5
Marital	Unmarried	104	70.3
	Married	44	29.7
Education	Primary	3	2.0
	Secondary	48	32.0
	Middle	99	66.0
	College and higher	0	0.0
Employment	Unemployed	105	70.0
	Employed	45	30.0
Family history of SCA	No	46	30.7
	Yes	104	69.3
Have you ever taken additional vaccines?	No	72	48.3
	Yes	77	51.7

Table 2. Knowledge questions and answers.

Questions and answers		Count	Column %
Additional vaccines don't cause any harm	I don't know	71	48.6
	No	14	9.6
	Yes	61	41.8
Additional vaccines don't cause any side effects	I don't know	67	45.9
	No	18	12.3
	Yes	61	41.8
Additional vaccines are very important to SCA patients	I don't know	63	43.2
	No	4	2.7
	Yes	79	54.1
SCA patients can have more than one vaccine at once	I don't know	88	60.3
	No	18	12.3
	Yes	40	27.4
Doctors advice SCA patients to take additional vaccines	I don't know	69	47.3
	No	8	5.5
	Yes	69	47.3
Vaccinated adults and children can protect others from contagious diseases	I don't know	70	48.6
	No	16	11.1
	Yes	58	40.3
Escaping your vaccines can harm the surrounding population	I don't know	84	57.5
	No	10	6.8
	Yes	52	35.6

level of expertise, where the mean \pm age of patients with low knowledge and high knowledge was 25.2 ± 6.8 and 26 ± 6.5 , respectively.

Discussion

SCA is an autosomal recessive disease characterized by abnormal hemoglobin production and is associated with high morbidity [13]. This disease is commonly

prevalent in the Mediterranean basin, sub-Saharan Africa, and Saudi Arabia [15]. The prevalence of SCA in Saudi Arabia is hard to be controlled due to the consanguineous marriage, which is high in rural areas [16]. Consanguineous marriage can increase the probability of having the defective gene responsible for sickle cell disease [17]. Among 150 SCA patients, more than one-half of our patients reported having a family history of SCA and thus ensuring the previous association

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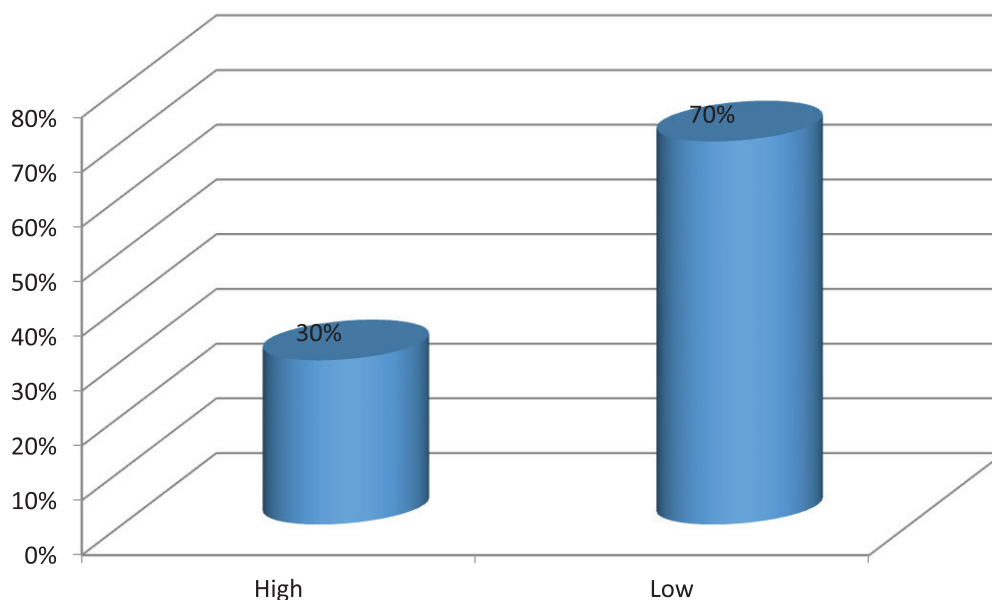


Figure 1. The overall knowledge among SCA patients.

Table 3. The correlations between the level of knowledge and demographics of the patients.

Variables		The level of knowledge				p-value
		Low knowledge		High knowledge		
		Count	Column N %	Count	Column N %	
Gender	Male	53	51.5	26	61.9	0.25
	Female	50	48.5	16	38.1	
Marital	Unmarried	75	72.1	29	65.9	0.45
	Married	29	27.9	15	34.1	
Education	Primary	3	2.9	0	0.0	0.50
	Secondary	34	32.4	14	31.1	
	Middle	68	64.8	31	68.9	
	College and higher	0	0.0	0	0.0	
Employment	Unemployed	80	76.2	25	55.6	0.01
	Employed	25	23.8	20	44.4	
Family history of SCA	No	32	30.5	14	31.1	0.93
	Yes	73	69.5	31	68.9	
Have you ever taken additional vaccines?	No	62	59.6	10	22.2	0.0001
	Yes	42	40.4	35	77.8	

between the consanguineous marriage and the prevalence of sickle cell disease. Several Saudi studies reported the knowledge about SCA; one study conducted on Riyadh residents reported a low awareness regarding SCA [18]. On the contrary, the awareness among dental students in Riyadh was satisfactory [14], and this can be attributed to the medical information the students received.

Sickle cell disease patients are more susceptible to infections due to the vaso-occlusive damage of the spleen, resulting in a state of functional asplenia in combination with other immune system dysfunction [19]. Such patients' susceptibility to infection makes them in need of vaccination and alteration in the vaccination schedule

[20]. A study from the United Kingdom reported low adherence to the advised vaccination schedule [20]. Regarding the prevalence of administering extra vaccines, we found that almost one-half of our patients administered additional vaccines. The prevalence of additional vaccines was not reported previously, so we present the first evaluation of the additional vaccine prevalence, which was high (51.7%).

The knowledge of patients about the extra vaccines in SCA was investigated through seven questions. Less than half thought that additional vaccines could cause harm and side effects, and one-half thought it is important for patients with SCA. More than half did not know if patients

with SCA can administrate more than one vaccine or not and did not know if missing their vaccines could harm the population. Less than half did not know doctors' advice regarding additional vaccines and did not know if the vaccinated individuals could be protected against the contagious diseases. The overall knowledge was low among most patients (70%). This very poor knowledge can be attributed to several factors, so we investigated factors that may affect the patients' level of knowledge. However, only two factors were associated with the level of knowledge, and they included employment and administration of additional vaccines. Being unemployed and administering no additional vaccines were associated with a low level of knowledge. Each gender, marital status, education level, and family history of SCA had no impact on the patients' level of knowledge.

Conclusion

As this is the first study to investigate SCA patients' knowledge regarding additional vaccines, we provide the first data on the understanding of patients with no comparable findings. Our findings showed that there was a high prevalence of administering additional vaccines among SCA patients. The SCA patients lack knowledge regarding the administration of extra vaccines. We could identify only two factors associated with a low level of knowledge: being unemployed and donating additional vaccines. This study is the first Saudi study conducted on the current subject; it is also the first study discussing the current subject globally; no previous study investigated this point. We provided the first Saudi data on the knowledge and prevalence of extra vaccines among patients with SCA. This study has some limitations as it is the first study, so that we could not compare our results with any previous findings, and the sample size was small. We recommend further studies with larger sample size and more questions investigating more details about the knowledge.

List of Abbreviations

SCA Sickle cell anemia

Conflict of interests

The authors declare that there is no conflict of interest regarding the publication of this article.

Funding

None.

Consent to participate

Informed consent was obtained from all the participants.

Ethical approval

The study was done after verbal approval of Sabya General Hospital, Jazan.

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