

# Evaluation of knowledge of the United Arab Emirates population on measles and its control, following a nationwide campaign

Ghiath Ismayl, Hiba J. Barqawi<sup>1</sup>, Abdelkader Harous<sup>2</sup>, Mohamad Balchi<sup>2</sup>, Dania AbuZahra<sup>2</sup>, Ghanayem AlMazrouei<sup>2</sup>, Tasnim Elzini<sup>2</sup>

General Surgery, Rashid Hospital, Dubai Health Authority, Dubai, <sup>1</sup>Department of Clinical Sciences, College of Medicine, University of Sharjah, Sharjah, United Arab Emirates, <sup>2</sup>Medical Students, College of Medicine, University of Sharjah, Sharjah, United Arab Emirates

## Access this article online

Website: [www.avicennajmed.com](http://www.avicennajmed.com)

DOI: 10.4103/ajm.ajm\_56\_19

## Quick Response Code:



## ABSTRACT

**Introduction:** In 2015, a nationwide campaign to eradicate measles was launched by the health authorities in the United Arab Emirates (UAE). This study aimed to assess the UAE society's knowledge of measles and its control following this campaign. **Methods:** A cross-sectional study was conducted among UAE residents above the age of 18 years from March to May 2017. A self-administered anonymous questionnaire was distributed, and a convenience sampling method was used. The data collected were entered and analyzed using the Statistical Package for the Social Sciences, version 22 software. **Results:** A total of 391 questionnaires were completed from the overall 410 distributed. Most of the population have heard of measles (94.6%). However, only 23.5% claimed they have high knowledge of the disease. Information on measles was mainly acquired from family and friends (50.3%). Individuals with higher educational status were more knowledgeable about several aspects of the disease. Married individuals and those with children were more likely to identify the symptoms and associated conditions of the disease correctly. However, married participants had more misconception about the relationship between autism and the measles vaccine. No significant differences were found between the different age groups, genders, or nationalities. **Conclusion:** Despite the nationwide campaign to eradicate measles, based on the results of our study, the majority of the UAE population did not have knowledge about the measles disease and its preventive measures. It is important that public health authorities and public health organizations seek to address these issues.

**Key words:** Measles, public health, vaccine

## INTRODUCTION

Measles is a highly contagious, serious disease caused by the measles virus that can be easily prevented through vaccines. Before widespread vaccination, measles caused around 2.6 million deaths annually. Widespread immunization activities have had a major influence on reducing measles mortality. From 2000–2017, measles vaccination prevented an estimated 21.1 million deaths.<sup>[1]</sup> However, the disease remains one of the leading causes of death among young children globally, despite the availability of a safe, inexpensive, and effective vaccine.<sup>[2]</sup>

**Address for correspondence:** Dr. Ghiath Ismayl, Rashid Hospital (Dubai Health Authority), Umm Hurair 2 Dubai, United Arab Emirates. P.O.BOX 4545.  
E-mail: [gismayl.syr-uk@hotmail.com](mailto:gismayl.syr-uk@hotmail.com)

Immunization has significantly reduced the burden of infectious diseases. It prevents illness, disability, and death from vaccine-preventable diseases, which include rubella, measles, pertussis, tetanus, rotavirus diarrhea, diphtheria, and polio.<sup>[3]</sup> One of the most important identifiable barriers to effective immunization is the knowledge and perception

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

**For reprints contact:** [reprints@medknow.com](mailto:reprints@medknow.com)

**Cite this article as:** Ismayl G, Barqawi HJ, Harous A, Balchi M, AbuZahra D, AlMazrouei G, *et al.* Evaluation of knowledge of the UAE population on measles and its control, following a nationwide campaign. *Avicenna J Med* 2020;10:35-40.

of society, especially parents, about vaccinations. Previous studies revealed misconceptions on parents' knowledge and negative attitudes toward childhood immunization.<sup>[4,5]</sup>

In 2014, the annualized measles incidence per 100,000 total population of the United Arab Emirates (UAE) was measured to be 3.09.<sup>[6]</sup> In efforts to eradicate measles in the UAE, an initiative, held in partnership with the Health Authority of Abu Dhabi and the Dubai Health Authority, was implemented to build stronger immunity against measles.<sup>[7]</sup> The campaign provided free measles, mumps, and rubella (MMR) vaccination to all UAE citizens and residents aged 1–18 years, from November 1 to November 26, 2015, at all health centers and through mobile teams deployed to schools. The free booster immunization dose was administered regardless of whether any previous vaccination dose of MMR had been given.

Although studies have been conducted in the UAE regarding knowledge on vaccinations, such as Human papilloma virus and influenza vaccines, no such studies have been reported about the measles vaccine, to the best of our knowledge.<sup>[8–10]</sup>

This study aimed to assess the UAE society's knowledge of measles and its control, following a nationwide campaign to eradicate measles.

## METHODS

This cross-sectional, descriptive study was designed to collect comprehensive data from UAE residents, both citizens and expatriates, above 18 years of age about their knowledge of measles infection and its control. Any subject who was not able to communicate either in English or Arabic was excluded from the study sample, as these were the only languages known to the researchers of this study. The study was conducted between the months of March and May 2017, using a convenience sampling method. Participants were selected randomly from public areas (shopping malls, public parks and beaches, restaurants, and cafés) in the three major cities of the UAE—Abu Dhabi, Dubai, and Sharjah—as they comprise the mass majority of the population and are considered the country's cultural and commercial cities.

A self-administered anonymous questionnaire was distributed to over 500 subjects of which 410 agreed to participate after explaining the procedure and obtaining written consent. The questionnaire was adapted from other studies performed on similar topics.<sup>[4,11,12]</sup> It consisted of three parts: (1) to obtain demographic data, (2) to gather information on the extent of knowledge of measles, and

(3) to determine the level of knowledge of the participants regarding measles control.

All personal information was treated with strict confidentiality. Data were entered electronically and analyzed using the IBM Statistical Package for Social Sciences (SPSS) software, version 22, IBM Corporate headquarters, Armonk, New York, USA. Data were expressed as frequencies and percentages unless otherwise stated. Chi-squared analysis was used to test for difference in proportions between two or more groups for categorical variables. A *P* value equal to or less than 0.05 was considered to be statistically significant.

The study was conducted according to national regulations in the UAE and was approved by the Ethics and Research Committee at the University of Sharjah.

## RESULTS

A total of 391 questionnaires were completed from the overall 410 distributed to individuals to whom our inclusion criteria applies. The questionnaires were spread almost equally among both genders, with 46.8% ( $n = 183$ ) of respondents being males, whereas 53.2% ( $n = 208$ ) of respondents being females. A total of 45.5% ( $n = 178$ ) of the respondents were less than 25 years of age, 27.6% ( $n = 108$ ) were between 26 and 35 years of age, whereas 26.9% ( $n = 105$ ) were aged more than or equal to 36 years. Only 35.4% ( $n = 131$ ) of the respondents were aware of the recent nationwide campaign for measles vaccination in the UAE. Most of the population have heard of measles (94.6%,  $n = 370$ ), but only 23.5% ( $n = 92$ ) claimed they have high knowledge about the disease [Table 1].

Family and friends were the main source of information on measles for the participants (50.3%,  $n = 186$ ), followed by the Internet and social media (35.4%,  $n = 131$ ), whereas general practitioners and physicians only accounted for 30.3% ( $n = 112$ ) [Figure 1].

The majority of the population recognized that measles is more common in children (89.7%,  $n = 332$ ) and that it is highly contagious (88.1%,  $n = 326$ ). Most of them also acknowledged that it can be controlled and prevented (86.2%,  $n = 319$ ), and that vaccination is a good preventive measure (93.8%,  $n = 347$ ). They also appreciated the importance of administering multiple doses of the measles vaccine, given at different intervals, to establish immunization (56.2%,  $n = 208$ ). The majority (79.7%,  $n = 295$ ) were also aware of the side effects caused by the measles vaccine, most commonly being fever. However, a good number of participants were

**Table 1: Variables associated with measles knowledge**

Variables	Frequency (n)	Percentage (%)
Total	391	100%
Gender		
Male	183	46.8%
Female	208	53.2%
Age group (years)		
≤25	178	45.5%
26–35	108	27.6%
≥36	105	26.9%
Nationality		
UAE	65	16.6%
Arab expat	245	62.7%
Non-Arab	81	20.7%
Occupation		
Medical and health-care related	57	14.6%
Others	334	85.4%
Married		
Yes	202	51.7%
No	189	48.3%
Children		
Yes	165	42.2%
No	226	57.8%
Educational status		
Uneducated	2	0.5%
High school education	38	9.7%
Undergraduate education	278	71.1%
Postgraduate education	73	18.7%
Heard of measles?		
Yes	370	94.6%
No	21	5.4%
Perceived knowledge about measles		
High	92	23.5%
Intermediate	268	68.5%
Low	10	2.6%
Not applicable	21	5.4%

unable to exclude measles vaccine as a cause for autism (33.2%, *n* = 123). Unfortunately, an unexpected number of participants perceived that medications (51.9%, *n* = 192), masks (41.4%, *n* = 153), body creams or coverings (18.6%, *n* = 69), and insect repellents (13.2%, *n* = 49) may play a role in measles prevention.

Most of the individuals were able to correctly identify rash (89.2%, *n* = 330) and fever (71.9%, *n* = 266) as symptoms of measles disease. However, only a few realized that lung (8.6%, *n* = 32) and brain (16.5%, *n* = 61) infection were associated conditions of the disease. Cough and sneeze (65.7%, *n* = 243) were recognized by most participants as possible methods of transmission, whereas less knew that direct contact (51.6%, *n* = 191) and even fewer realized that blood contamination (22.2%, *n* = 82) are also possible routes. Also, less than half realized that measles can cause death (45.7%, *n* = 169) [Table 2].

Married individuals and those with children were more likely to identify the symptoms and associated conditions of measles correctly compared to the non-married and those without children;  $\chi^2 (7, n = 391) = 23.2, P = 0.002$  and  $\chi^2 (7, n = 391) = 14.36, P = 0.045$ , respectively. Married individuals were also more aware of the importance of receiving multiple doses of the vaccine given at different intervals to ensure adequate immunity,  $\chi^2 (4, n = 391) = 9.49, P = 0.05$ . However, they had more misconception about the relationship between

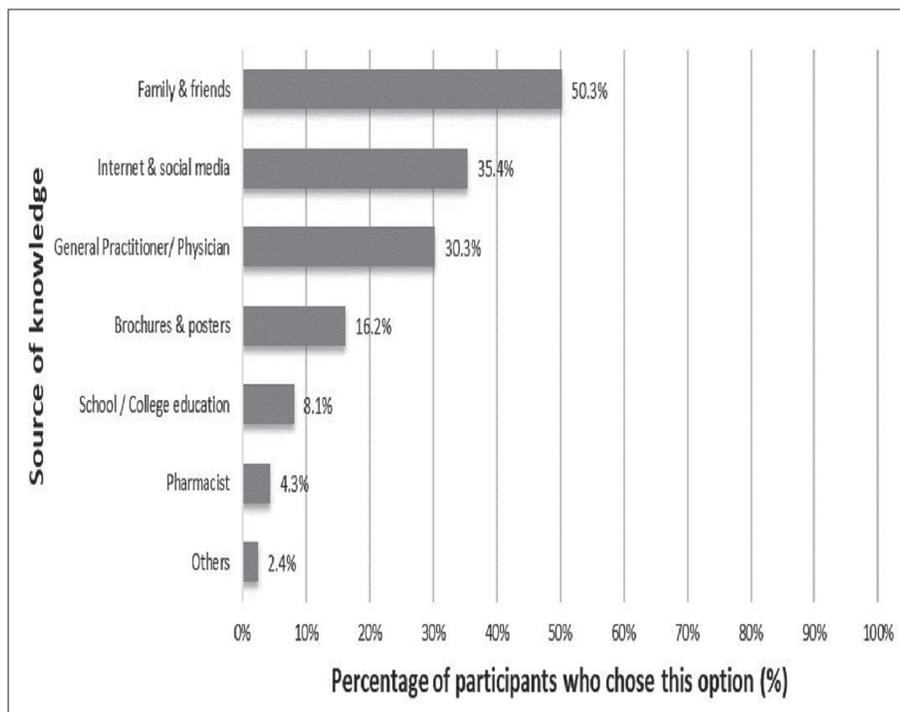


Figure 1: Source of knowledge about measles among participants

autism and the measles vaccine,  $\chi^2 (3, n = 391) = 8.61, P = 0.035$ , and the utilization of masks as preventive or control measures,  $\chi^2 (4, n = 391) = 9.52, P = 0.049$ . Participants with higher educational status were more knowledgeable about the symptoms and associated conditions of the disease,  $\chi^2 (28, n = 391) = 53.72, P = 0.002$ , the fact that the disease can be controlled and prevented,  $\chi^2 (16, n = 391) = 91.37, P < 0.001$ , the importance of multiple doses of the vaccine given at different intervals,  $\chi^2 (16, n = 391) = 28.23, P = 0.03$ , as well as fever as a possible consequence of the vaccine,  $\chi^2 (16, n = 391) = 37.22, P = 0.002$ . No significant differences

were found across the other knowledge aspects for the participants based on marital status, the presence of children, or educational status [Table 3]. Furthermore, no significant differences were present in terms of age, gender, or nationality in assessing the knowledge on measles.

## DISCUSSION

Starting November 2015, thousands of students across UAE schools were given the MMR vaccine as part of a nationwide campaign to eradicate measles. Health-care professionals

**Table 2: Participants response to the knowledge questions about measles (n = 370)**

Knowledge questions	Participants response, % (n)		
	Yes	No	I do not know
Measles is more common in children	89.7 (332)	3.2 (12)	7.1 (26)
Measles is a highly contagious infection	88.1 (326)	4.6 (17)	7.3 (27)
Measles can cause death	45.7 (169)	31.9 (118)	22.4 (83)
Measles can be controlled/prevented	86.2 (319)	3.0 (11)	10.8 (40)
Measles vaccination is a good preventive measure	93.8 (347)	2.2 (8)	4.0 (15)
Multiple doses of measles vaccination given at different intervals are essential	56.2 (208)	17.3 (64)	26.5 (98)
Measles vaccination can cause autism	3.8 (14)	66.8 (247)	29.4 (109)
Fever can result from measles vaccinations	79.7 (295)	7.3 (27)	13.0 (48)
Medications are good preventative/control measures for measles	51.9 (192)	28.6 (106)	19.5 (72)
Masks are good preventative/control measures for measles	41.4 (153)	27.6 (102)	31.1 (115)
Body coverings/creams are good preventative/control measures for measles	18.6 (69)	45.7 (169)	35.7 (132)
Insect repellants are good preventative/control measures for measles?	13.2 (49)	50.6 (187)	36.2 (134)
Measles symptoms and associated conditions			
Rash	89.2 (330)	10.8 (40)	
Fever	71.9 (266)	28.1 (104)	
Lung infection/pneumonia	8.6 (32)	91.4 (338)	
Brain infection/encephalitis	16.5 (61)	83.5 (309)	
Measles routes of transmission			
Direct contact/touch	51.6 (191)	48.4 (179)	
Cough and sneeze	65.7 (243)	43.3 (127)	
Blood contamination	22.2 (82)	77.8 (288)	

**Table 3: Chi-squared test of independence, comparing the respondents across the different knowledge variables based on marital status, presence of children, and educational status (n = 391)**

Knowledge variables	Married			Children			Educational status		
	$\chi^2$	df	P	$\chi^2$	df	P	$\chi^2$	df	P
Measles symptoms and associated conditions	23.20	7	0.002*	14.36	7	0.045*	53.72	28	0.002*
Measles routes of transmission	2.30	5	0.70	3.26	5	0.66	24.58	20	0.22
Measles is more common in children	3.45	3	0.33	6.27	3	0.09	17.12	12	0.14
Measles is a highly contagious infection	2.13	4	0.71	3.77	4	0.44	18.31	16	0.31
Measles can cause death	3.15	4	0.53	2.59	4	0.63	20.46	16	0.20
Measles can be controlled/prevented	4.59	4	0.33	1.62	4	0.81	91.37	16	<0.001*
Measles vaccination is a good preventive measure	4.23	5	0.52	5.29	5	0.38	14.28	20	0.82
Multiple doses of measles vaccination given at different intervals are essential	9.49	4	0.05*	1.98	4	0.74	28.23	16	0.03*
Measles vaccination can cause autism	8.61	3	0.035*	1.38	3	0.71	11.59	12	0.48
Fever can result from measles vaccinations	3.23	4	0.52	6.65	4	0.16	37.22	16	0.002*
Medications are good preventative/control measures for measles	3.41	4	0.49	2.92	4	0.57	22.03	16	0.14
Masks are good preventative/control measures for measles	9.52	4	0.049*	6.37	4	0.17	24.57	16	0.08
Body coverings/creams are good preventative/control measures for measles	2.70	4	0.61	2.69	4	0.61	23.07	16	0.11
Insect repellants are good preventative/control measures for measles	4.98	4	0.29	8.88	4	0.06	22.981	16	0.114

df = degrees of freedom

\*Statistically significant (P ≤ 0.05)

were identified and trained to conduct on-site supervision of the campaign, whereas parents of students were approached with health educational materials and consent forms.<sup>[7]</sup>

The questionnaire used in this study assessed the community's knowledge of the measles disease and its control, following the UAE measles eradication campaign of 2015. Similar to another study conducted within the region, most participants correctly identified that measles is much more common in children compared to that in other age groups.<sup>[11]</sup> Moreover, the majority of the sample recognized that measles is a very contagious infection. However, less than half of the participants were able to distinguish the possibility of mortality associated with measles infection. This shows parallelism with an Australian study in which only 29.9% of the participants recognized death as a complication of measles. This signifies the importance of raising awareness to the complications and fatalities attributed to this disease.<sup>[12]</sup>

An extensive majority of the respondents were able to identify typical nonspecific symptoms of measles, such as rash and fever. However, very few could correctly recognize any further clinical features or potential complications owing to the disease. They perceived that lung infections and brain infections were not majorly associated with measles. Likewise, in the Australian study, only 10.4% of their population acknowledged pneumonia and 33.3% recognized brain infection as complications of measles. The results show that there is clearly an underestimation of measles and that there is limited knowledge of the disease consequences among people.<sup>[12]</sup>

The modes of transmission of measles were not fully known to the participants. Almost half did not choose direct contact, and even more were unaware of blood contamination as plausible forms of transmission. Conversely, cough and sneeze were recognized by the majority. Concerned parents often look to friends and family members as a source of information, rendering them susceptible to false information. As shown in this study, family and friends were the main source of information for the participants on measles, whereas health professionals accounted for only a third. This reinforces the importance of the role of health-care providers as educators and not only as healers.

Assessment of participants' knowledge in this study showed positive inclination to childhood immunization. The majority knew that measles is a preventable and controllable disease, and they recognized that immunization is the best

preventative measure for measles. This correlates with several studies in other parts of the world including Saudi Arabia, Pakistan, and Spain.<sup>[11,13,14]</sup>

Generally, the administration of vaccines may be associated with common local reactions such as pain, swelling, and redness at the injection site. The majority of participants were aware of the main side effects caused by the measles vaccination as opposed to other studies, where far fewer participants identified adverse effects associated with vaccine administration.<sup>[15]</sup> Although a large percentage of the participants correctly acknowledged that measles vaccine has no correlation to autism, a handful of the respondents were unable to exclude the relation between the two. Similar findings were found in the Australian study.<sup>[12]</sup>

The results of this study also revealed significant correlation between educational level and knowledge on measles, which coincides with the results found in a study conducted in Greece.<sup>[16]</sup>

It is important to note that the UAE has a very diverse population, of which only 10% are UAE nationals and the remainder is made up of expatriates; therefore, it is not surprising to find that the majority of our sample (62%) were Arab expats. However, all UAE residents have access to health-care services as by law, health insurance must be provided to an employee and their dependents.<sup>[17]</sup>

*Limitations:* This study was based on a self-administered questionnaire. Consequently, reporting bias and desirability for providing correct answers were possible. Length of stay in the UAE was not taken into consideration, and considering most of the respondents were expatriates (which is typical for this dynamic country with a continuous influx of migrant employees), this can create bias by new residents who recently settled in the UAE, who were not exposed to or made aware to the measles campaign or who may have information from their own home countries.

## CONCLUSION

Despite the nationwide campaign to eradicate measles, based on the results of our study, the majority of the UAE population did not have knowledge about the measles disease and its preventive measures. It is important that public health authorities and public health organizations seek to address these issues. Better means of public education need to be developed and awareness campaigns

should be organized to properly educate the UAE society about measles and its control. This study served as a potential program evaluation, and it found potential deficiencies that need to be addressed in future campaigns in the UAE.

### Recommendations

Developing health educational campaigns that provide public knowledge about the deficient areas of knowledge observed in this study should be a priority for the health authorities of the UAE in the near future. We have already conducted a study about the knowledge on measles and its vaccine, so further studies about the barriers of and facilitators to measles vaccines may be beneficial for future campaigns and educational programs.

### Financial support and sponsorship

Nil.

### Conflicts of interest

There are no conflicts of interest.

## REFERENCES

1. WHO. Measles. (2019, May 9). Available from: <http://www.who.int/mediacentre/factsheets/fs286/en/> [Last accessed on 2019 June 20].
2. Matsumura T, Nakayama T, Okamoto S, Ito H. Measles vaccine coverage and factors related to uncompleted vaccination among 18-month-old and 36-month-old children in Kyoto, Japan. *BMC Public Health* 2005;5:59.
3. WHO Centre. Immunization coverage. Fact sheet, July 2018. Available from: <https://www.who.int/news-room/fact-sheets/detail/immunization-coverage>. [Last accessed 2019 June 20].
4. Nisar N, Mirza M, Qadri M. Knowledge, attitudes and practices of mothers regarding immunization of one year old child at Mawatch Goth, Kemari town, Karachi. *Pakistan J Med Sci* 2010;26:183-6.
5. Siddiqi N, Siddiqi AE, Nisar N, Khan A. Mothers' knowledge about EPI and its relation with age-appropriate vaccination of infants in Peri-urban Karachi. *J Pak Med Assoc* 2010;60:940-4.
6. WHO. Immunization (n.d.). Available from: [https://www.who.int/immunization/monitoring\\_surveillance/burden/vpd/surveillance\\_type/active/measlesreportedcasesbycountry.pdf](https://www.who.int/immunization/monitoring_surveillance/burden/vpd/surveillance_type/active/measlesreportedcasesbycountry.pdf). [Last accessed 2019 June 20].
7. Taryam MMO, Hammadi HMYA, Al Faisal W, Hussein HY, AlSerkal FY, Monsef NA, *et al.* Mass vaccination against measles among private schools population of Dubai 2015–2016, coverage, refusal and response rates. *Int J Ped Neo Heal* 2017;1:7-12.
8. Saqer A, Ghazal Sh, Barqawi H, Babi JA, AlKhafaji R, Elmekresh MM. Knowledge and awareness about cervical cancer vaccine (HPV) among parents in Sharjah. *Asian Pac J Cancer Prev* 2017;18:1237-41.
9. Ortashi O, Raheel H, Shalal M, Osman N. Awareness and knowledge about human papillomavirus infection and vaccination among women in UAE. *Asian Pac J Cancer Prev* 2013;14:6077-80.
10. Abu Hammour W, Al-Saleh S. Knowledge, attitudes, and practice of healthcare workers toward influenza vaccination at Al Jalila Children's Specialty Hospital (AJCH) – Dubai, UAE. *Int J Pediatr Adolesc Med* 2019;6:16-20.
11. Yousif MA, Albarraq AA, Abdallah MAA, Elbur AI. Parents' knowledge and attitudes on childhood immunization, Taif, Saudi Arabia. *J Vaccines Vaccin* 2013;5:215.
12. Brieger D, Edwards M, Mudgil P, Whitehall J. Knowledge, attitudes and opinions towards measles and the MMR vaccine across two NSW cohorts. *Aust N Z J Public Health* 2017;41:641-6.
13. Asim M, Malik N, Yousaf H, Gillani I, Habib N. An assessment of parental knowledge, belief and attitude toward childhood immunization among minorities in rural areas of District Faisalabad, Pakistan. *Mediterr J Soc Sci* 2012;3:153-9.
14. Borràs E, Domínguez A, Fuentes M, Batalla J, Cardeñosa N, Plasencia A. *et al.* Parental knowledge of paediatric vaccination. *BMC Public Health* 2009;9:154.
15. Kimmel SR. Vaccine adverse events: Separating myth from reality. *Am Fam Physician* 2002;66:2113-20.
16. Papazoglou A, Giamaïou K, Pouloupoulou S, Pavlopoulou I, Tsoumakas K. The National Vaccination Programme in Greece: Factors affecting parents' knowledge. *Global J Med Res Interdiscip* 2013;13:04-12.
17. The Official Portal of the UAE Government. Health insurance (n.d.). Available from: <https://www.government.ae/en/information-and-services/health-and-fitness/health-insurance> [Last accessed 2019 June 20].