

## Public Opinion Regarding The New National Children's Obligatory Vaccination Schedule (2018)

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### Abstract

**Background:** Childhood vaccination has a great role in major worldwide reductions in morbidity and mortality and is considered to be one of the most effective public health interventions in terms of numbers of infections and deaths avoided per year. **Objectives:** To assess knowledge and practice regarding the new children's obligatory vaccination schedule (2018) and to identify barriers of incomplete vaccination and the sources of their information. **Method:** A cross-sectional study was conducted on 290 mothers. Through a multistage sampling technique, four health facilities were selected to represent Sharkia governorate whereas the sample units were proportionally allocated. The study included mothers of children younger than one year of age. Mothers were interviewed using the Fahmy questionnaire to assess the socioeconomic status and a modified semi-structured questionnaire to assess mothers' knowledge and practice and to identify sources of their information and possible barriers of incomplete vaccinations. **Results:** The studied mothers showed an inadequate total knowledge score (61%) and poor total practice (59%). Mothers' age, education, and occupation affected the total knowledge. Mothers' education, occupation, and social class were the determinants affecting the total practice score. Health care providers (71%) and family relatives (67%) were the commonest sources of information. Sick baby (63%) and presence of family problems (31%) were the commonest barriers for none or incomplete immunization. **Conclusion:** The knowledge and practice of the studied mothers were unsatisfactory. Continuous health education should be provided to overcome the found barriers and encourage complete immunization.

**Keywords:** *awareness, barriers, practice, children, immunization.*

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### Introduction

Children's compulsory vaccinations have greatly decreased the burden of many infectious diseases. It also prevents illness, disability, and death from vaccine-preventable diseases like Measles, Pertussis, Diphtheria, Polio, Rubella, and Tetanus.<sup>1,2</sup>

Immunizing a child is greatly reducing the costs of disease treatment, providing a healthy childhood and also reducing poverty and suffering.<sup>3</sup> World Health

Organization reported that about (115 million) infants received Diphtheria-Tetanus and Pertussis vaccine worldwide and about 85% of the world's children had received one dose of measles and polio vaccine per year and this lead to prevention of about (2 to 3 million) deaths each year from Diphtheria, Tetanus, Pertussis (whooping cough), and Measles.<sup>4</sup> The Egyptian ministry of health and population modified children's obligatory

vaccination schedule in 2018 by adding new vaccines like the Salk vaccine for polio and Haemophilus influenza type B vaccine and giving a birth dose of hepatitis B vaccine. The coverage rates of compulsory vaccination were ranged from (96-98%) in 2010 but these rates became ranged from (94-96%) in 2018, and in the same report, the coverage rate of newly added hepatitis B vaccine birth dose was only (89%).<sup>5</sup>

Mothers' knowledge and practice play an important role in accomplishing complete immunization before the first birthday of the child. Many factors participate in the success or failure of immunization program.<sup>6</sup> For example, unawareness of side effects and contraindications of immunization, negative perceptions about immunization in mild illness, and mother's fear of vaccination. All of the previous factors were considered as the major barriers to childhood vaccination.<sup>7</sup> In many countries, the number of parents who were refusing consent for their children vaccination have been increased.<sup>8</sup>

Good knowledge and practices of mothers help to complete vaccination of their children and to decrease the burden of dreadful infectious diseases, which are best prevented and controlled by vaccination.<sup>6</sup>

This work aimed to assess knowledge and practice about the updated children's obligatory vaccination among mothers attending health units in Sharkia governorate and to identify barriers for incomplete immunization and the sources of their information.

## Method

A cross-sectional study was conducted on (290) mothers based on the prevalence of poor practice about children obligatory vaccination among mothers was 25.2% and the total population (number of

children aged less than one year in Sharkia governorate) was 206,388 according to the Central Agency for Public Mobilization and Statistics (CAPMAS, 2017), using an online open epi program at 95% confidence level and 5% precision.

Through a multistage sampling technique, Zagazig and Belbeis health districts were selected by simple random technique to represent the Sharkia governorate (which consisted of 19 health districts).

Belbeis health district includes one urban health center and (33) rural health units. Two health facilities were selected randomly to represent urban and rural areas of the district. In the same way, two health facilities were selected to represent urban and rural areas of the Zagazig health district (which includes only one urban health center and (31) rural health units). So, four health facilities were selected to represent the Sharkia governorate. Sample units were collected by systematic random sampling from each health facility, the sample distributed by the proportional allocation method on the selected health facilities.

The study included mothers of children younger than one year of age attending the selected health facilities for obligatory vaccination according to the national vaccination schedule. Mothers were interviewed using the scoring system of Fahmy et al., 2015<sup>10</sup> to assess the socio-demographic characteristics, and a self-designed questionnaire with the help of a previous study done in Egypt<sup>9</sup> to assess the knowledge (importance of the vaccines, routes of vaccines administration, contraindications of vaccinations) and practice (dealing with vaccination's fever, managing the swelling of vaccination site) of the selected mothers. Extra questions regarding the updated national vaccination schedule

2018 (do you know the newly added vaccines, what is the importance of the newly added vaccines, targeting what

**Table (1): Socio-demographic data of the studied group**

Socio-demographic data	Study group (n=290)	
	No	%
<b>Age/ years</b>		
<b>Mean + SD</b>	28.5 ± 5.6	
<b>Range</b>	19 - 38	
• ≤30 years	189	65.1
• > 30 years	101	34.8
<b>Number of family members</b>		
• ≤4	129	44.5
• > 4	161	55.5
<b>Residence</b>		
• Rural	153	52.8
• urban	137	47.2
<b>Education</b>		
• Less than Secondary		
• Secondary & Intermediate	57	19.7
• Higher education	146	50.3
• Higher education	87	30.0
<b>Occupation</b>		
• Non-working	182	62.8
• Working	108	37.2
<b>SES</b>		
• Low	69	23.8
• Middle	179	61.7
• High	42	14.5

SES=socio economic standard

diseases) and possible barriers for incomplete vaccination were added. The questionnaire was validated by panels of experts in community and family medicine departments. A pilot (10% of the total sample) was implemented to estimate the time needed to obtain the required information, and there were no administrative or technical obstacles found (the total sample included the pilot sample (internal pilot sample)). The questionnaires took about 15 minutes to be fulfilled. The

study implemented at a period of 8 months (from July 2019 to January 2020).

Social class was classified according to Fahmy and his colleagues into high (33.6–48), middle (19.2-<33.6), and low (<19.2) depending on the score calculated (48). Regarding knowledge and practice items the correct answer scored= (1) and the Incorrect answer scored = (0). Adequacy of knowledge and practice was as follows: cut off point is 60% whereas > 60 was considered as adequate knowledge and good practice and ≤ 60% was considered as inadequate knowledge and poor practice 11.

**Administrative approval:** The study was approved by the Sharkia health directorate. An official permission letter was obtained from the authority and directed to the selected health districts and health facilities.

#### **Ethical approval**

Ethical considerations were taken through the whole study including fully informed participants with the purpose and nature of the study and then oral consent was taken from participants. Coded numbers for each participant were used to guarantee privacy. Official approval from the Institutional review board (IRB) was taken (ZU-IRB #5059).

#### **Statistical analysis**

Data were analyzed using the Statistical Package of Social Science (SPSS) program for Windows (Standard version 20). The normality of data was first tested with a one-sample Kolmogorov-Smirnov test. Quantitative data were described using mean ± SD (standard deviation). Qualitative data were described using the number and percent. Association between categorical variables was tested using the Chi-square test and Chi-square for trend. Logistic regression was used to identify independent predictors for

adequate knowledge and good practice used to calculate crude odds ratio and about children obligatory vaccination. Epi Confidence interval Info version 7 statistical packages was

**Table (2): Relation between Socio-demographic data and total knowledge score about children obligatory vaccination among the studied sample**

Socio-demographic variables	Total knowledge score		Test of significance	
	Adequate n=113 (%)	Inadequate n=177 (%)	p-value	COR (95% CI)
<b>Age/ years</b>				
- Less than or equal 30 years	40 (21.2)	149 (78.8)	0.000**	9.71(5.6-16.97)
-More than 30 years	73 (72.3)	28 (27.7)		1.00
<b>Education</b>				
-less than secondary education	18 (31.8)	39 (68.4)	0.841	1.00
-Secondary &Intermediate	44 (30.1)	102 (69.9)	0.001**	0.93 (0.48-1.81)
-Higher education	51 (58.6)	36 (41.4)		3.07 (1.52-6.19)
<b>Occupation</b>				
- Not working	44 (24.2)	138 (75.8)	0.000**	5.5 (3.30-9.32)
-Worker	69 (63.9)	39 (36.1)		
<b>Residence</b>				
-Rural	55 (36.0)	98 (64.1)	0.265	1.3 (0.815-2.09)
-Urban	58 (42.3)	79 (57.7)		1.00
<b>SES</b>				
-Low toMiddle	89 (35.9)	159 (64.1)	0.009**	2.38 (1.22-4.627)
-High	24 (57.1)	18 (42.9)		1.00

\*\* : Highly statistically significant SES=socio economic standard COR crude Odds ratio CI Confidence interval

**Table (3) Multivariate analysis of some Socio-demographic data predictors for adequate total knowledge score:**

Variables	β	p	Odds ratio	95% C.I.	
				Lower	Upper
Age (More than 30 years )	5.023	0.000**	151.880	33.478	689.60
Education (Higher education)	3.110	0.000**	22.413	4.011	125.260
Less than secondary(reference)		0.000**			
Occupation ( working)	1.965	0.000**	7.135	2.860	17.798
SES (High)	1.016	0.035*	2.763	1.076	7.094

\*\* : Highly statistically significant \* = statistically significant

For all the above mentioned statistical tests done, The test results were considered significant when p value < 0.05 and highly significant difference was present if p≤0.001.

**Results**

Mean age of the studied sample was (28.510 ± 5.604). The largest percentage of the studied mothers were less than or equal 30 years old (65.17%), from rural residence (52.8%), secondary educated (35.5%), not working (62.7%), of moderate social class (61.7%) and having

more than four family members (55.5%) (Table1).

The majority of the studied sample were having inadequate total knowledge score (177/290) (61.0%) and poor total behavior

**Table (4): Relation between Socio-demographic data and total practice score about children obligatory vaccination among the studied sample**

Socio-demographic variables	Total practice score		Test of significance	
	Good n=119 (%)	Poor n=171 (%)	p-value	COR (95% CI)
<b>Age/ years</b>				
- ≤ 30 years	72 (38.1)	117 (61.9)	0.164	1.4 (0.86-2.30)
- > 30 years	47 (46.5)	54 (53.5)		1.00
<b>Education</b>				
-less than secondary education	18 (31.6)	39 (68.4)	0.526	1.00
-Secondary &Intermediate	53 (36.3)	93 (63.7)		1.2 (0.64-2.37)
-Higher education	48 (55.2)	39 (44.8)		0.005*
<b>Occupation</b>				
- Not working	63 (34.6)	119 (65.4)	0.004**	2.03 (1.25-3.31)
-Worker	56 (51.8)	52 (48.1)		1.00
<b>Residence</b>				
-Rural	66 (43.1)	87 (56.9)	0.442	0.83 (0.52-1.33)
-Urban	53 (38.7)	84 (61.3)		1.00
<b>SES</b>				
-Low to Middle	89 (35.9)	159 (64.1)	0.000**	4.47 (2.18-9.16)
-High	30 (71.4)	12 (28.6)		1.00

\*: statistically significant \*\*: Highly statistically significant SES=socio economic standard, COR crude Odds ratio CI Confidence interval

**Table (5) Multivariate analysis of some Socio-demographic data predictors for good total practice score:**

Variables	β	p	Odds ratio	95% C.I.	
				Lower	Upper
<b>Education</b> (Higher education)		0.129			
less than secondary education(reference)	0.639	0.315	1.894	0.831	4.317
<b>Occupation</b> ( working)	0.492	0.096	1.636	0.916	2.922
<b>SES</b> (High)	1.196	0.000**	4.366	2.047	9.313

\*\*: Highly statistically significant

score (171/290) (59.0%) about children obligatory vaccination (results not tabulated)

There was a statistically significant relationship between age, education, occupation and social class with total knowledge score about children obligatory vaccination (p<0.05) (Table 2).

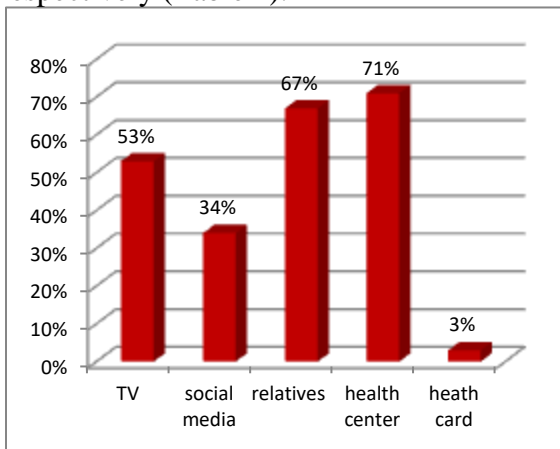
where mothers with age more than 30 years, highly educated, working and of high

social calss were having adequate knowledge (9,3,5 and 2 times) respectively more than mothers with age less than or equal 30 years, less than secondary education, not working, and of low to middle social class (Table 2).

Mothers , their ages More than 30 years, highly educated, working, and of high social class were significant independent variables for adequate knowledge score about children obligatory vaccination (AOR=151.88,

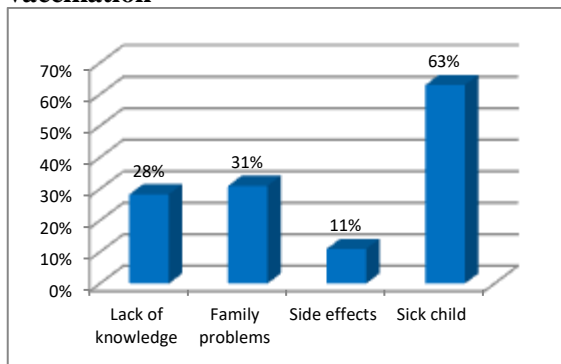
22.41, 7.14 and 2.76) folds respectively (Table 3).

There was a statistically significant relationship between education, occupation and social class with total practice score about children obligatory vaccination (p=0.005, p=0.004 and p=0.000) respectively (Table 4).



\*: mothers were allowed to choose more than one choice

**Figure (1) shows sources of mothers' information about children obligatory vaccination**



\*:the total percent of the columns above 100% as more than one answer was allowed

**Figure (2) shows barriers of none or incomplete vaccination among the studied sample**

where highly educated mothers, working and of high social calss were having good practice (2, 2 and 4 times) respectively more than mothers their education less than secondary educated, not working mothers and of low to middle social class (Table 4).

Mothers of high social class was significant independent variable for good practice score (AOR=4.366, p=0.000). However, being highly educated and working were non-significant independent factors (AOR=1.894 and 1.636, p>0.05) (Table 5). Most common sources of mothers' information about children obligatory vaccination were from health centers (71.0%) and their relatives (67.0%) and the least one was from health card (3.0%) (Figure 1)

Most common barriers of none or partial vaccination among studied sample were a sick child (63.0%) followed by family problems (31.0%) and the least reason was fear of vaccination side effect (11.0%) (Figure 2)

### Discussion

Child vaccination has a major role in the preventive aspects of infectious diseases like morbidities, disability, and death. Giving the child the appropriate vaccinations would significantly decrease the costs of disease treatment and rates of disease occurrence thus achieving a good quality of life for children.<sup>12</sup>

The study revealed a high percentage of inadequate total knowledge score among the studied mothers (61%) and about half of them had a poor practice of (59%) towards obligatory vaccines. This was in contrast with a study done in Saudi Arabia, 2018 which revealed a total high KAP (knowledge, attitude, and practice) of the studied parents (87.2%).<sup>12</sup> Also, a retrospective record based study done in Catalonia revealed that about 70% of the studied parents thought that vaccination should be obligatory and of great importance in the babies' life.<sup>13</sup> An Iraqi study, 2014 showed 66.1% of the parents were found to have adequate KP scores regarding children vaccination.<sup>6</sup>

Multivariate regression revealed that mothers' age (above 30 years), highly educated, working, and of high social class were independent predictors for adequate total knowledge score, this can be explained with increasing the mothers' experience by time and high contact with the community and gaining more informative data. As regarding practice score - on the opposite - multivariate analysis revealed that mothers of high social class was the only significant independent variable for good practice score this may be explained by higher awareness and better environmental conditions, These results were supported by a study done in Japan which found that children whose mothers were younger and less educated, and those of low socio-economic standard were at a high risk of not being up-to-date with the immunization status with significant negative practice.<sup>14</sup> An Indian study, 2017 done on 500 mothers proved that high mothers' awareness and complete child vaccination were associated with mothers age (> 26 years) and higher education.<sup>15</sup> A study done at Al-Beida City, Libya showed reversed results which demonstrated that mothers' education and occupation didn't affect child vaccination.<sup>16</sup> The same was demonstrated by Saudi study done on 420 Saudi parents in Hail City, which showed no statistical significance between the higher KAP and age or education level.<sup>17</sup> Different results were showed by a cohort study done in two northern Italian regions as follows; mothers who were over 35 or less than 25 years old, with higher formal education, and citizens of highly-developed countries were less compliant with vaccination recommendations with evident negative attitude in both the regions.<sup>18</sup>

The commonest source of mothers' information was health care providers (doctors and paramedics) in the primary health centers (71%) this was expected as they are the vaccination service providers, then the family relatives (67%), television (TV) and social media (53% and 34% respectively), and the least one was birth health card (the blue one for a boy baby and the pink one for a girl baby). There was an obvious relationship between vaccine confidence and confidence in the child's physician whereas mothers that were confident in the health care providers were more likely to be confident in vaccines and greatly encouraged to complete the child vaccinations.<sup>19</sup> Similar results reported by a study done in Solvania and found that physicians (84.6%) and friends (51.9%) were the commonest sources of mothers' information regarding child vaccines.<sup>19</sup> A cross-sectional study done in Poland revealed that parents who take their information from medical professionals showed proper practice and adherence to vaccination schedules and mothers who used less informative professional sources (e.g. leaflets, social media) and those with a lower level of education were more likely to avoid vaccination.<sup>20</sup> Another study done in Egypt on 385 mothers attending Al-Amyria Family Centre asking about their sources of information regarding obligatory vaccines revealed that the health care provider was the main source (32.5%) followed by TV (26.5%) regardless mothers' age or level of education.<sup>21</sup>

The current study revealed that sick baby (chronically ill baby with a permanent illness with longevity as hepatic or renal affection) / or long term baby illness which is acute disease takes long management course but treatable and curable) was the

commonest barrier for none or incomplete child vaccination (63%) due to the mother's concept of her baby can't tolerate the vaccination side effects because of his illness, followed by the presence of family problems (31%) (Divorce, neglect, and death of mother or father) due to the family preoccupation or neglect, lack of knowledge and fear of vaccination side effects were the least ones (28% and 11% respectively). A study done in the United States showed that fear of vaccination side effects (as autism), Objection to a large number of injections, lack of access, and lack of information were the commonest causes of non and partial child immunization which recommended to be overcome.<sup>22</sup> These were in concomitant with a study done in Ethiopia, 2018 among 484 mothers showed that the most common reasons for non or incomplete child vaccination were fear of adverse reactions (36%), being too busy (31%), or hearing hearsays about vaccines (28%).<sup>23</sup> A systematic review for many published in peer-reviewed journals in English, Spanish and Portuguese languages from January 1992 to June 2014 was implemented and reported that the most cited factors affecting mothers adherence to vaccination schedule were higher birth order, low maternal education/ socioeconomic status and irregular follow up by health care services (documenting the next vaccination session date or calling upon delay).<sup>24</sup>

## Conclusion

Mother's knowledge and practice regarding children's obligatory vaccination is unsatisfactory. The health care providers and media played an important role in providing the public with trustful information.

## Recommendation

Continuous health education sessions should be provided in all primary health care facilities with the help of TV programs and other media facilities to enhance public adherence to the vaccination schedule.

*Study limitations:* the study site should be expanded to include samples from the other health districts, and applied on larger sample size.

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