Rate of Vaccination of Children at Diyala Province & the Effect of Parental Education on Vaccination Status, Hospital Based Study

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Abstract

Background: Iraq is one of the countries which applicated routine vaccination schedule many years ago, however, still many infectious diseases attack children , e.g. whooping cough & tuberculosis, which was supposed to be absent or decreased dramatically by such vaccination program like what was happened at many developed countries since decades. Many causes had been implicated, one of these reasons may be the response of the population to that program. In Iraq, all the vaccines were given freely & the visits are voluntary, furthermore, many T.V. & Radio programs & newspapers urge the people towards vaccination, nevertheless, many children had not been vaccinated as we see in our clinical practice, but we don't know to which degree this problem is present. So this study was came as a trial to expose some of secrets of this problem by finding the rate of vaccination, although it was a hospital based data, but it may give an idea about the vaccination status in the province, in addition, the effect of parental education on population compliance to the schedule will be searched.

Patient & Method: The study was done at Al- Batool teaching hospital for maternity & children at Baquba city from 1st of September 2011 – 1st of September 2012, random sample was collected from both in- & out-patients, it involved children of one year old or below, history of immunization of those children according to the Iraqi schedule of vaccination was taken from parents, supported by vaccination card if it was available.

Results: The immunization status of 259 child had been reviewed with the parents. Those were fully vaccinated children (in 180 child (70%)), partially vaccinated children (in 63 child (24%)) , & non- vaccinated children (in 16 (6 %)). Both mother's & father's education had positive significant effect on the compliance of the parents to vaccinate their children (p value was 0.000 & 0.001, respectively).

Conclusion: Rate of vaccination at this study was higher than that found in Iraq at 2010, but not reached to the level of well economic countries. we need to encourage vaccination, at the same time explaining their side effects and ways of management in front of vaccinations benefits to break up any refusal idea.

Key Words: vaccination, education, Diyala, Al- Batool.

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الخلاصة

يعتبر العراق احد الدول التي اعتمدت جدول اللقاحات الروتيني للأطفال منذ عدة سنوات للحد من انتشار الأمراض الانتقالية، برغم من ذلك لازال هنالك انتشار لبعض هذه الأمراض مثل السعال ألديكي و مرض التدرن. قد يكون عدم الالتزام بهذه اللقاحات هو أهم الأسباب لذلك برغم مجانية اللقاحات والدعم الإعلامي لذلك. أقيمت هذه الدراسة لمعرفة معدل التلقيح عند الأطفال في محافظة ديالى هذا مع دراسة تأثير درجة التعليم عند الوالدين على هذا المعدل باعتباره احد العوامل المؤثرة في الوعي الصحي للمجتمع.الاعتماد في هذه الدراسة على الأطفال المراجعين إلى مستشفى البتول التعليمي للنسائية والأطفال وقد أخذت عينة عشوائيا من الذين أعمارهم سنة فما دون خلال فترة سنة واحدة. وقد تبين أن ٧٠ % ملقحين كاملا حسب الجدول العراقي للتلقيحات الروتينية وان ٢٤ % لم يتم تلقيحهم احد أو بعض تلك اللقاحات بينما ٦% لم يتم تلقيحهم بالكامل، على أية حال يعتبر معدل اللقاحات في هذه الدراسة أعلى مما نشرته منظمة اليونيسيف حول معدل التلقيح عند الأطفال في عموم العراق سنة ٢٠١٠ لكنه لا يصل إلى مستوى بعض الدول المجاورة مثل السعودية والأردن وإيران. تم كذلك التوصل إلى أن مستوى التعلم لدى الوالدين له تأثير مباشر على لالتزام بجدول اللقاحات.

مفاتيح الكلمات: لقاحات ،تعليم، ديالى، البتول.

Introduction

Immunization is a remarkably successful and very cost-effective means of preventing infectious diseases and is one of the leading achievements of public health and pediatrics. As a result of routine childhood immunizations, the occurrence of one common contagious diseases declined markedly in the United States and other countries in the second half of the 20th century. Public health programs based on vaccination have led to global eradication of smallpox, elimination of wild-type polioviruses from the Americans and likely from the world in the near future, and more than 95% reduction in the United States of invasive *Haemophilus influenzae* type b (Hib) disease.[1] Despite this success, some parents continue to refuse immunizations for their children.[2] It is ironic that the remarkable success of vaccine programs has resulted in a situation in which most parents have no memory of the devastating effects of illnesses such as poliomyelitis, measles, and other vaccine-preventable diseases, making it more difficult for them to appreciate the benefits of immunization.[2]

There is a substantial gap between immunization requirements and actual compliance even though it is known that vaccination compliance is a fundamental aspect of preventive healthcare.[3]

Numerous studies have been conducted to find predictors of non-compliance with childhood vaccinations. A study conducted to identify vaccination barriers in children 12 to 24 months and found that of the parents who were surveyed, only 20% reported that their children were currently up-to-date with their immunizations. [4] A study done by Bundt found that non-minority children with parents of higher socio-economical background were far more likely to have complete immunization.[3]

Medical and scientific evidence surrounding vaccinations demonstrate that the benefits of preventing suffering and death from infectious diseases far outweigh rare adverse effects of immunization.[5,6] However, since vaccination began in the late 18th century, opponents have claimed that vaccines do not work, that they are or may be dangerous, that individuals should relay on personal hygiene instead, or that mandatory vaccinations violate individual rights or religious principles.[7] These arguments have succeeded in reducing vaccination rates in certain communities, leading to increased outbreaks of preventable, and sometimes fatal, childhood illnesses.[8]

Vaccines may cause side effects, and the success of immunization programs depends on public confidence in their safety. Concerns about immunization safety often

follow a pattern: some investigators suggest that a medical condition is an adverse effect of vaccination; a premature announcement is made of the alleged adverse effect; the initial study is not reproduced by other groups; and finally, it takes several years to regain public confidence in the vaccine.[5]

Pediatricians are finding themselves increasingly at odds with parents who question the safety of vaccines or refuse vaccines.[9,10] The incidence of parental vaccine concerns and/or refusals appears to be increasing.[11-13] More than 20% of parents are reported to have significant concerns about the safety of childhood immunizations, and these concerns have been associated with a significant decrease in rates of immunizations in children.[14-16] Approximately 15% of underimmunization has been attributed to parental vaccine safety concerns.[12,17]

Several studies have addressed factors leading to delay in vaccination. Though the child eventually gets the immunization, this concept is important because in many cases the delay causes inadequate vaccination of the child. Dombkowski, Lantz, and Freed found these factors to include: single-parent households, larger family size, low parental education level, Medicaid enrollment, absence of primary health care provider, and lack of insurance coverage. [18]

Luman, McCauley, Shefer, and Chu focused on maternal characteristics associated with non-compliance. The maternal characteristics in this study were as follows: mothers who were African-American, had not completed high school, had an income below 50% of the federal poverty level, being divorced, separated, or widowed, and having multiple children. [19]

Aim of the Study

It aimed to find the rate of vaccination of children at Diyala province to get an idea about the compliance of the population to vaccination schedule & to study the effect of parental education on that rate.

Patient and Method

This is a retrospective study, it was conducted at al- Batool teaching hospital for maternity & children from 1st of September 2011 – 1st of September 2012.

The collected sample was include children of one year old or below , care was taken to involve each patient once a time. History of vaccination was taken in details, one by one, month by month, from the parents, supported by vaccination card if available, an ordered self administered questionnaire was used.

The regimen which had been dependent in the study was the Iraqi routine vaccination schedule, this include the following vaccines (up to one year of life which was our target):

1st week: BCG, hepatitis B vaccine, oral polio vaccine.2nd month: DTP, hepatitis B vaccine, oral polio vaccine.4th month: DTP, oral polio vaccine.6th month: DTP, hepatitis B vaccine, oral polio vaccine.9th month: measles vaccine.

Any child had suspicion of a disease related to a deficient vaccination, e. g. pertusis, had not been included in the study to avoid bias, furthermore, extradoses of immunization taken at home by the moving teams were not involved in the study because they are supporting doses & not part of the routine regimen & they may be taken irregularly depending on the team & the availability of the family at home at the time of vaccination, so it will create disorganization.

The collected data had been classified into 3 groups of children: fully vaccinated group including children who complete the vaccination up to their age, partially vaccinated group which involve the children who were partially vaccinated (one or more vaccine was not taken up to his age), while the last group include the not- vaccinated children who were not taken any vaccine at all.

Parental Education

Educational attainment was classified into five groups according to the highest academic qualification depending on Iraqi program of education: .

1- Not- educated (illiterate): include person who didn't admit to the school or who admit but had no academic qualification (less than completed 6 year of education).
2- Primary-school attainment: include person who complete the primary school (6 year of education or more but hadn't intermediate school- attainment).
3- Intermediate-school attainment: include person who complete the intermediate school (9 year of education or more but hadn't Preparatory-school attainment).
4- Preparatory-school attainment: include who complete the preparatory school (12 year of education or more but hadn't higher-education attainment).
5- Higher-education attainment: include who complete higher education study (education of 14 year or more).
6- This classification was applied for each parent, so we try to find the association between vaccination status of the children and the level of education of each parent separately.

Statistical Analysis

The statistic was done to find the percent of each group of children & each vaccine, and the association between the vaccination status & education of the parents, SPSS version 10 was used (chi- square was applicated to find these associations).

Results

During period of one year of study, the immunization status of 259 child had been reviewed with the parents. Those were divided into 3 groups:

1- Fully vaccinated children: those were 180 (70 %) child.
2- Partially vaccinated children: those were 63 (24 %) child.
3- Non- vaccinated children: those were 16 (6 %) child only.

The whole sample of the study consist of male children 146 (56.5 %) & female 113 (43.5%). Table (1) will descriptively show the sex character of the sample of the study distributing to the above three groups of children.

According to the information which had been taken from parents, the causes of missing of vaccination in the partially vaccinated & non-vaccinated groups were either due to an illness or due to a family neglect, table (2) appears that family neglect causing missing of vaccination in more than half of children in both groups. It is an important to mention that most of the families who didn't vaccinate their children at the health centers due to a family neglect were accepting & vaccinating them by the moving teams which came to the home.

The age of children in the sample of the study vary from below 1 month of life to one year of life, so the rate of compliance of children in this study for each vaccine had been accounted to the number of children who reached &/ or pass the age of recommendation of that vaccine, table (3).

Both mother & father having the decision to vaccinate the child or not, their education play an important role, this was very clear when we found most of fully vaccinated children having educated parents & the reverse for partially & non- vaccinated group of children, tables (4)& (5).

Table (1): Show the sex of children distributed to the vaccination status.

Sex / Vaccination Status	Male no. (%)	Female no. (%)	Total no. (%)
Fully vaccinated	92 (36)	88 (34)	180 (70)
Partially vaccinated	42 (16)	21 (8)	63 (24)
Not- vaccinated	12 (4.5)	4 (1.5)	16 (6)
Total	146 (56.5)	113 (43.5)	259 (100)

Table (2): Reasons of missing vaccination in this study.

Reason / Group	Illness no. (%)	Family Neglect no. (%)	Total no. (%)
Partially vaccinated	28 (35.5)	35 (44.5)	63 (80)
Non- vaccinated	6 (7.5)	10 (12.5)	16 (20)
Total	34 (43)	45 (57)	79 (100)

Table (3): Iraqi program of vaccination & the rate of vaccination.

Age	Vaccine	Vaccinated no. (%)	Not- vaccinated no. (%)	Total no. (%)
Birth – 1st week	**BCG**	236 (91)	23 (9)	259 (100)
	Hep B 1*	232 (90)	27 (10)	259 (100)
	Oral Polio 1*	232 (90)	27 (10)	259 (100)
2nd month	**DTP 1***	192 (82)	42 (18)	234 (100)
	Hep B 2	192 (82)	42 (18)	234 (100)
	Oral Polio 2	192 (82)	42 (18)	234 (100)
4th month	**DTP 2**	142 (76)	45 (24)	187 (100)
	Oral Polio 3	142 (76)	45 (24)	187 (100)
6th month	**DTP 3**	101 (74)	36 (26)	137 (100)
	Hep B 3	101 (74))	36 (26)	137 (100)
	Oral Polio 4	101 (74)	36 (26)	137 (100)
9th month	**Measles**	41 (77)	12 (23)	53 (100)

* Some vaccines were numbered, it indicates the dose number for that vaccine.

Table (4): Shows the level of maternal education & vaccination status of the sample of the study.

Maternal Education		Vaccination Status				P Value
		Fully vaccinated no. (%)	Partially vaccinated no. (%)	Not-vaccinated no. (%)	Total no. (%)	
Educated	Primary School	60 (23)	26 (10)	5 (2)	91 (35)	0.000
	Intermediate School	19 (7)	6 (2)	2 (1)	27 (10)	
	Preparatory School	25 (10)	1 (0)	0 (0)	26 (10)	
	Higher Education	55 (22)	5 (2)	2 (1)	62 (25)	
Not –educated		21(8)	25 (10)	7 (2)	53 (20)	
Total		180 (70)	63 (24)	16 (6)	259 (100)	

Table (5): Shows the level of father's education & vaccination status of the sample of the study.

Father's Education		Vaccination Status				P Value
		Fully vaccinated no. (%)	Partially vaccinated no. (%)	Not-vaccinated no. (%)	Total no. (%)	
Educated	Primary School	33 (13)	14 (5)	5 (2)	52 (20)	0.001
	Intermediate School	25 (10)	11 (4)	2 (1)	38 (15)	
	Preparatory School	34 (13)	4 (2)	3 (1)	41 (16)	
	Higher Education	72 (28)	12 (5)	4 (1)	88 (34)	
Not- educated		16 (6)	22 (8)	2 (1)	40 (15)	
Total		180 (70)	63 (24)	16 (6)	259 (100)	

Discussion

The results showed that a considerable proportion (6%) of the studied children at Al-Batool teaching hospital were missing all basic vaccines, while 24 % were missing some of these vaccines, this corresponds to a fully vaccination coverage of 70 %.

When we compare the results of this study to that found by UNICEF for vaccination coverage in Iraq at 2010, we found it was higher, & it was nearest to that found in Syria & Yemen by UNICEF at the same year, except for BCG vaccine at Yemen which had very low coverage. In opposition, Completely the reverse is found when this comparison is applied with results of UNICEF in Saudi Arabia (KSA), Jordan & Iran, table (6).

Table (6): Results of the current study compared to the results of UNICEF 2010 in Iraq & some of neighboring countries.

Vaccine	Current Study %	Iraq[20] %	KSA[21] %	Jordan[22] %	Syria[23] %	Yemen[24] %	Iran[25] %
BCG	91	80	98	95	90	65	99
DPT 1	82	81	98	98	89	94	99
DPT 3	74	65	98	98	80	87	99
Oral Polio 3	76	69	98	98	83	88	99
Hep B3	74	64	98	98	84	87	99
Measles	77	73	98	98	82	73	99

Surprisingly, UNICEF statistics at 2010 revealed that vaccination in Iraq had low coverage rate than a low economic countries, Syria & Yemen & it was miserably highly differs from well economic states, Saudi Arabia, Jordan, & Iran. This study was done two years after UNICEF statistics, it showed that vaccination rate at diyala province was more than that found in other areas in Iraq, but not reached to the optimum of the other countries. Really are study population are not different from other Iraqi people in most of aspects of life (demographic, socioeconomic, educational , & cultural state), so we think the difference was either due to increasing compliance of the population to vaccination in those progressed 2 years or there was a problem in the study that it was hospital based study including most of the well caring families & excluding poor & neglecting one.

Regarding the effect of parental education & the rate of vaccination, it was very clear about positive relationship for both father's & mother's education & rate of vaccination, so father's & mother's education had high significant effect on rate of vaccination of their children (P value was 0.001 & 0.000, respectively). This is go with what was found by Dombkowski, Lantz, and Freed & Luman, McCauley, Shefer, and Chu.[18,19] Really this is a good point to stop & discuss it because the reverse was found in many other studies, they found that children who are undervaccinated due to parental choice tend to be from families with higher socioeconomic state (SES) and have parents with college degrees when compared with children who are fully vaccinated.[26,27] another study supports these findings by examining physician-reported estimates of the SES and education levels of the families in their practices.[28] In those studies many potential reasons was mentioned: Wealthier parents may have better access to the Internet and media sources that discuss potential vaccine safety issues and more time to devote to investigating potential concerns. Also, families who are wealthier and more educated may feel more empowered to question physicians' and governmental recommendations about immunizations.[28] In the current study the reverse was completely found, the most probable explanation is that accesses to the internet and media sources that discuss potential vaccine safety issues still are limited & not achieved for everyone in our society, this in turn create a good confidence in our medical services, on the other hand, our society still complaining from devastating diseases developed as a result of deficient vaccination at past, e.g. limping in poliomyelitis affected person & tuberculosis, this is a positive point enforce educated families to vaccinate their babies.

Conclusion and Recommendation

1- Although this study had a hospital based data, it may indicate a good health progression. Population based study is needed annually to confirm this progression.

2- Most of families were vaccinating their babies by the movable teams, this suggests doing of all vaccination schedule by these teams.

3- More lessons & programs are needed to encourage vaccination especially for non educated families, at the same time explaining their side effects & ways of management in front of vaccinations benefits to break up any refusal idea may enter to our society from internet & so. This will better be done as a part of basic education at schools.

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