Assessment Of Immune Response Of Children Vaccinated Against Viral Diseases: A Meta-Analysis Of Egyptian Studies In The Last Ten Years

Thesis submitted for fulfillment of PhD
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BY

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ABSTRACT

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Abstract:

Background: Vaccines are considered the most cost-effective health investment.

Objective: is to provide the first meta-analysis of immune response of Egyptian children to viral vaccines, factors affecting it and duration of sero-protection of each viral vaccine.

Methodology: The researcher reviewed the Egyptian theses, papers, journals, in English language, searching for the eligible studies published in the last ten years. Meta-analysis was done using MedCalc software ver. 12.7.7.0. The pool consists of 43 studies.

Results: In this meta-analysis, regarding hepatitis B virus vaccine, 33 studies were included with a total number of 9611 healthy Egyptian vaccinated child, the proportion of seroprotected Egyptian children is 66.13%., the proportion of children with positive HBc antibodies is 2.81%, the proportion of children with positive HBs antigen is 0.64%. The mean HBsAb titer increases after booster dose by 267.96±232.95 mIU/ml. Regarding MMR vaccine, 10 studies were included, with 1141 cases, the proportions of seroprotected Egyptian

children against measles, mumps and rubella respectively are 80.74%, 45.06 and 90.21%.

Conclusion: The vaccination program in Egypt seems to be highly effective. The age related immunity waning after vaccination suggests the need of booster dose.

Recommendations:

Further studies need to be done to study the cellular immune response, also the immune response of other vaccines especially the non-obligatory vaccines.

Additional follow up study are needed to determine the duration of immunological memory.

Key words: vaccine, immune response, polio vaccine, Rotavirus vaccine, hepatitis B vaccine, hepatitis A vaccine, measles, mumps, rubella, influenza vaccine and varicella vaccine.

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List of abbreviations

APC	Antigen presenting cells
CDC	Center of Disease Control and Prevention
CI	Confidence index
DC	Dendritic cells
DTP	Diphtheria-tetanus- pertussus vaccine
HBc Ab	Hepatitis B core antibodies
HBs Ab	Hepatitis B surface antibodies
HBsAg	Hepatitis B surface antigen
HBV	Hepatitis B virus
Hep	Hepatitis vaccine
Hib	Hemophilus influenza virus vaccine
IgG	Immunoglobulins G
IPV	Inactivated polio vaccine
MMR	Measles – mumps – rubella vaccine
MMRV	Measles – mumps – rubella- varicella vaccine
MOHP	Ministry of Health and Population
NIP	National Immunization Program
OPV	Oral polio vaccine
WHO	World Health Organization

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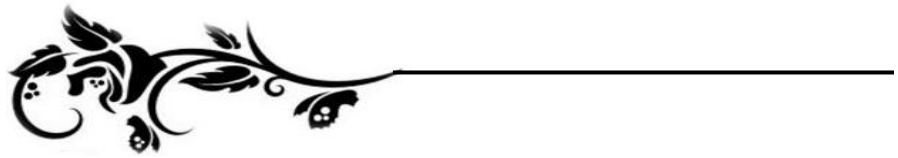
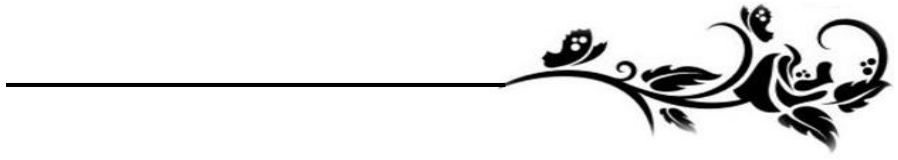


INTRODUCTION



INTRODUCTION

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The invention of vaccination was a turning point in the war between microbes and humans. Vaccines represent the most cost-effective life-saving device in history. Despite their success, one of the great ironies of vaccines is that the vast majority of vaccines have been developed empirically, with little or no understanding of the immunological mechanisms by which they induce protective immunity **(Pulendran and Ahmed , 2011).**

Viral vaccines can be classified into two broad groups, live attenuated vaccines and subunit vaccines. Many of these are live viruses that have been cultivated under conditions that disable their virulent properties. They typically provoke more durable immunological responses. Examples of these viral diseases are measles, rubella, and mumps. Attenuated vaccines have some advantages and disadvantages. They have the capacity of transient growth so they give prolonged protection, and no booster dose is required. But they may get reverted to the virulent form and cause the disease (**Steel, et al, 2009).**

The subunit vaccines (the vaccine against recombinant hepatitis B, usually contain substances called adjuvants, which enhance the magnitude and modulate the quality of the immune response (**Plotkin, et al. 2012).**