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RESEARCH ARTICLE

A cross sectional survey: Attitude towards adult vaccination in Karachi-Pakistan

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Abstract

As per the estimates of *National Interview Health Survey* (*NHIS*) -2012, adult vaccination is extensively ignored and a very less number of adults could receive recommended vaccine doses. Thus, a cross sectional study was conducted to evaluate the knowledge and attitude towards adult vaccination programs among the adult citizens of Karachi, Pakistan. The survey covered about 54.28% of the total areas of Karachi, Pakistan. A questionnaire comprising of 11 questions was designed and a total of 500 individuals ranging from 11-61 years of age participated in the study. Responses to each question were statistically analyzed and the associations between different variables were established using SPSS 16. According to the results, majority (93.4%) of the individuals considered vaccines safe for health and more than 80% agreed that adult immunization is as necessary as child immunization however, a significant difference ($p<0.05$) was noticed between the vaccination schedule follow up rates during childhood and adulthood and only a few individuals could receive the recommended adult vaccines. A significant association ($p<0.05$) was also found between the frequency of infections and the factors that may affect the efficiency of immune system such as sleeping disorders, smoking, persistent depression/anxiety, alcohol intake and the use of anti-depressive drugs/steroids/cortisones. Results showed that a number of reasons may increase the reluctance of people towards any vaccination program such as the cost, risk of quality assurance and requirement of booster doses. Thus, the study emphasizes on the need of awareness programs for adult vaccination as the lack of awareness and ignorance in this sector may render masses susceptible to serious & life threatening infections.

INTRODUCTION

Vaccination is the most commonly adopted strategy to prevent children from infections worldwide. The first immunization program was launched in Pakistan in 1978 namely Expanded Program on Immunization (EPI) to protect children from tuberculosis, poliomyelitis, diphtheria, pertussis, tetanus and measles. The objective of this program was to eradicate polio by 2012, eliminate measles and neonatal tetanus by 2015 and to reduce the number of vaccine-preventable diseases (Siddiqi et al., 2007). However, despite the success of this program, none of the targets have been achieved yet and Pakistan is still ranked in the top 3 countries worldwide where polio is endemic and among the 9 Asian countries where neonatal tetanus is one of the main causes of infant mortalities (Sheikh et al., 2013). The measles epidemics in 2013 with more than 200 mortalities also raised several questions on these

ongoing immunization programs. Several reasons may attribute towards the failure of these immunization programs mainly lack of demographic statistics, poor surveillance infrastructure, low coverage, the parental attitude, concerns about risks and vaccine safety, influx of unimmunized refugees, inadequate awareness, poor training of health care professionals, storage facilities and the quality of vaccine itself (Niazi and Sadaf, 2014). In addition to these public health issues, the base line data about the adult vaccination is also missing and there is no concern about initiating the adult immunization programs to control infections as in Pakistan, majority of these programs are for the children up to five years of age.

In general, people are more concerned about child vaccination and because of lack of awareness and knowledge, emphasis towards adult vaccination is highly ignored. Even in a developed country like US, adult immunization rates are not so promising resulting in hundreds of thousands of hospitalizations each year (CDC, 2011). Infact, adult vaccination should be considered mandatory and be given an equal emphasis as child immunization. As per CDC recommendations, all adults must receive flu vaccine and Tdap vaccine (tetanus, diphtheria and pertussis) every year. Other infections that can be vaccine preventable in adults include measles, mumps, rubella, hepatitis A, hepatitis B, chickenpox, Shingles and some of the infections caused by *Streptococcus pneumoniae*, *Neisseria meningitidis, Haemophilus influenzae* type b (Hib) and Human papilloma virus (HPV) (Broder et al., 2006; Roush et al., 2007; Hinman et al., 2011). Thus, an adult vaccination schedule is highly recommended for the one to follow starting at the age of 19 upto 65 years of age or older. In addition to flu and Tdap vaccines that are well recommended for adults, other vaccines are also administered to the targeted adult populations on the basis of age, non-communicable disease status, certain medical conditions, travel and occupation etc.

According to a previous study, adolescents should be vaccinated and briefed about the importance of vaccines before they leave school to enhance the elimination rates of infections (Valeri et al., 2014). Although, there are a number of survey reports from all over the country presenting the statistics of child immunization with reference to a particular infection (Nisar et al., 2010, Wahed et al., 2013; Rehan et al., 2014) but only a few reports have been published so far with reference to adult vaccination rates (Qidwai et al., 2007). Thus, the present study was aimed to conduct a survey regarding the attitude, general perception and practices towards adult vaccination among the citizens of Karachi. The study will be helpful in providing the insights into the need of public awareness programs towards adult vaccination and training of health care professionals in improving the immunization rates.

METHODOLOGY

A cross-sectional survey was conducted in Karachi from March 2014-June 2014. A semi structured questionnaire (newly) designed according to the study objectives was used as a data collection tool. A total of 500 individuals were randomly selected from 18 different towns of Karachi and requested to fill up the questionnaire. Participants were given assurance about the confidentiality and privacy of their feedbacks.

The designed questionnaire (comprised of 11 questions) was principally categorized into three components. First component included the demographic details of the participants whereas, the second component covered their general concepts and perceptions about importance and safety of vaccination for adults. In third section, questions relevant to the existence of some common non-communicable diseases, immunization status of the participants against different infections and the subsequent frequency of these infections were asked. Some questions enquiring other than normal routine activities such as smoking, sleep disorders, anxiety or depression, alcohol intake and use of anti-depressive/steroids were also asked to have an idea about the possible impact of these factors influencing the immune status. The time duration to complete the questionnaire was estimated to be 15-20 minutes (Kaaijk et al., 2014).

Computation of frequencies (%) of all categorical variables was done using SPSS (release 16) and the associations between different variables were evaluated using the Pearson's chi-square test. Results were statistically analyzed using $p<0.05$.

RESULTS

A total of 500 individuals were surveyed out of which 275 (55%) were females and 225 (45%) were males. Among females, 45 (16.4%) were married and among males, 35 (15.6%) were married as shown in table 1. Majority (82.2%) of the individuals were students by occupation and the mean age of the individuals was estimated to be 22.8±8.03 years. The maximum aged individual was 61 years old whereas the minimum age was 11 years.

When the questions relevant to some factors that may affect the efficiency of immune system such as smoking, sleeping disorders, alcohol intake, use of antidepressants/steroids/cortisones and persistent depression or anxiety

were asked, majority of the individuals (71 %) did not check on any of the above mentioned activities or problems (fig 1).

Among the respondents, 93.6% agreed on the statement that vaccines are safe for health (table 2a) and 86.2% emphasized that vaccination is equally important for adults as it is considered for children. However, 13.8% respondents didn't consider adult vaccination as mandatory (table 3a, fig 2). These responses were also found significantly associated with gender at 5% level of significance ($p< 0.05$) as most of the respondents who considered vaccination safe for health and mandatory for adults were females (table 2b & 3b).

When asked about the previous history of any adverse/allergic reaction to vaccination, 98% participants declared no such past experience however; allergic reactions like skin rashes were also indicated by the rest (fig 3). 38% of the respondents thought that there should be no reason for why someone shouldn't be vaccinated whereas, 33% expressed the cost of vaccine as the major reluctance factor. About 11.8% and 10.8% responses were in agreement with allergic reactions and fear of needles, discomfort and pain respectively as a reason to avoid vaccination (fig 4).

The administration of vaccines during pregnancy was supported by 84.4% of the participants. When asked about their behavior with polio survey teams, 90% answered that they cooperate with these surveillance teams whereas, others (10%) denied showing their reservations on either the quality (5%), side effects (3%) and the religious beliefs (2%) pertinent to polio vaccination (table 4, fig 5). When the attitude towards a vaccination program with repeated dose administration was investigated, it was noticed that 19% of the respondents didn't show interest in following a vaccination program with booster doses mentioning their busy schedules (6.8%), needle phobia (6.2%) and inadequate information about the vaccine (5.5%) (fig 6).

Majority of the participants (95.6%) were found healthy with none of the asked non communicable diseases (table 5). As shown in table 6, a significant association ($p<0.05$) was noticed between the frequency of infections and the factors that may directly or indirectly influence the efficiency of immune system such as smoking, sleep disorders, persistent depression & anxiety, alcohol intake and use of antidepressives/steroids/cortisone.

As can be noted from fig 7, rate of vaccination sharply decreases after childhood and a significant difference ($p<0.05$) was found in the frequency of vaccination between childhood and adulthood. However, it may be noted that frequency of infections also decreases with the growing age as children are more vulnerable to infections because of poor immunity (fig 8).

Tables

Table 1: Demographic profile of the participants with reference to gender and marital status

Gender * Marital status		Marital Status		
		Married	Single	Total
Gender	Female	45	230	275
	Male	35	190	225
	Total	80	420	500

Table 2 (a): Responses showing individual concerns about vaccine safety for health

		Gender		
		Female	Male	Total
Vaccine are safe or not	No	9	23	32
	Yes	266	202	468
Total		275	225	500

Table 2 (b): Test of independence showing that the responses about vaccine safety are gender dependant

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	9.977[a]	1	.002		
Continuity Correction[b]	8.851	1	.003		
Likelihood Ratio	10.108	1	.001		
Fisher's Exact Test				.003	.001
N of Valid Cases	500				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 14.40.
b. Computed only for a 2x2 table

Table 3(a): Responses showing individual concerns about the significance of adult vaccination

		Gender		
		Female	Male	Total
Vaccines are important for adults	No	27	42	69
	Yes	248	183	431
Total		275	225	500

Table 3(b): Test of independence showing that the responses about vaccine importance for adults are gender dependant

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	8.145[a]	1	.004		
Continuity Correction[b]	7.418	1	.006		
Likelihood Ratio	8.119	1	.004		
Fisher's Exact Test				.006	.003
N of Valid Cases	500				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 31.05.
b. Computed only for a 2x2 table

Table 4: Responses showing the attitude of the respondents towards polio surveillance teams

Attitude towards polio vaccination	Frequency	Percent	Valid Percent	Cumulative Percent
Cooperation With polio teams	450	90.0	90.0	90.0
Reasons incase of No cooperation				
1. Fear of side effects	18	3.6	3.6	93.6
2. Fear of quality assurance	24	4.8	4.8	98.4
3. Fear of quality assurance & religious issues	1	.2	.2	98.6
4. Ethical/ religious issues	7	1.4	1.4	100.0
Total	500	100.0	100.0	

Table 5: Frequency of non communicable diseases among the selected population of adults

Non communicable diseases	Frequency	Percent	Valid Percent	Cumulative Percent
None	478	95.6	95.6	95.6
Heart disease	2	.4	.4	96.0
Diabetes	6	1.2	1.2	97.2
Chronic lung disease	2	.4	.4	97.6
Kidney failure, end-stage renal disease, or on dialysis	3	.6	.6	98.2
Chronic liver disease	1	.2	.2	98.4
Spleen has been damaged or removed	1	.2	.2	98.6
Cancer or cancer treatments	1	.2	.2	98.8
HIV	2	.4	.4	99.2
Has had a bone marrow transplant	4	.8	.8	100.0
Total	500	100.0	100.0	

Table 6: Association between the frequency of infections and the factors* affecting immune system

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	38.046[a]	16	.001
Likelihood Ratio	43.405	16	.000
N of Valid Cases	500		

a. 26 cells (76.5%) have expected count less than 5. The minimum expected count is .45.
* Factors include smoking, sleep disorders, alcohol intake, persistent depression and use of antidepressive agents/steroids

FIGURES

Fig 1: Responses about the factors that may influence the efficiency of immune system

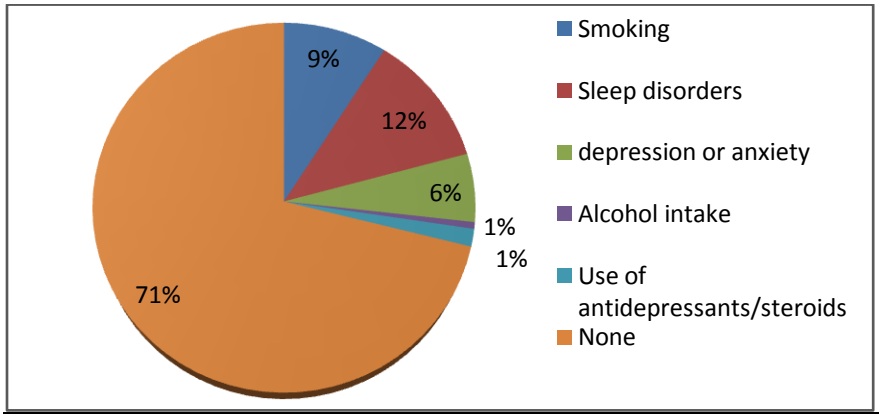


Fig 2: Gender based responses relevant to vaccine safety and importance of vaccination for adults

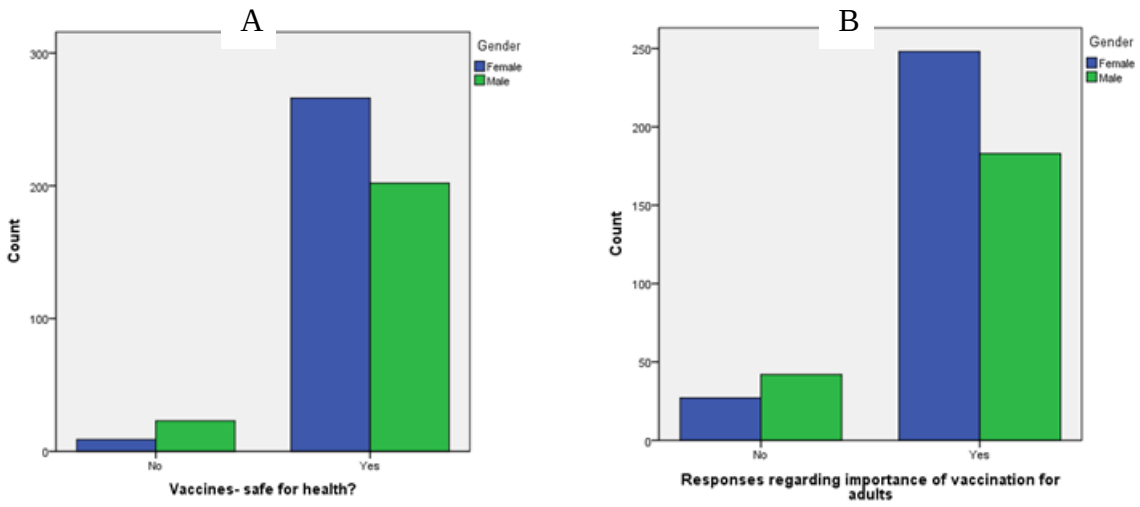


Fig 3: Responses demonstrating the frequency of post vaccination allergic reactions

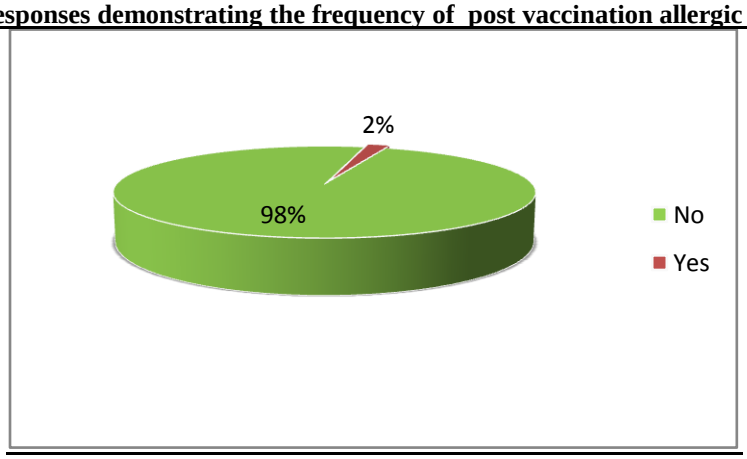


Fig 4: Respondents answers for why someone should not be vaccinated

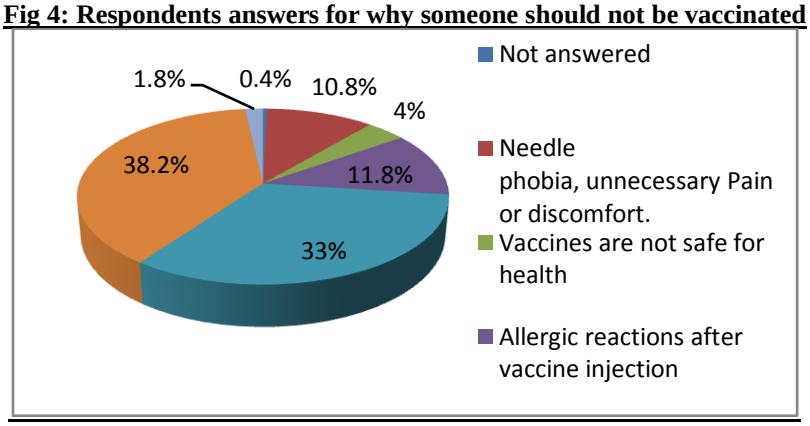


Fig 5: Respondents attitude towards the Polio surveillance teams

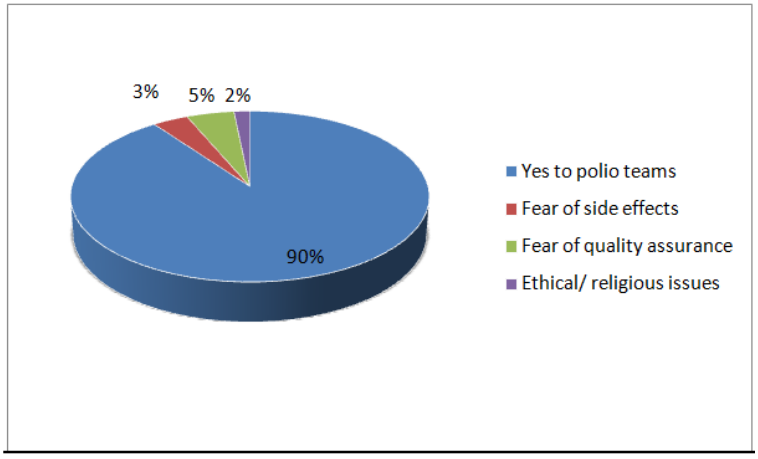


Fig 6: Willingness of the respondents to follow immunization with repeated/booster doses

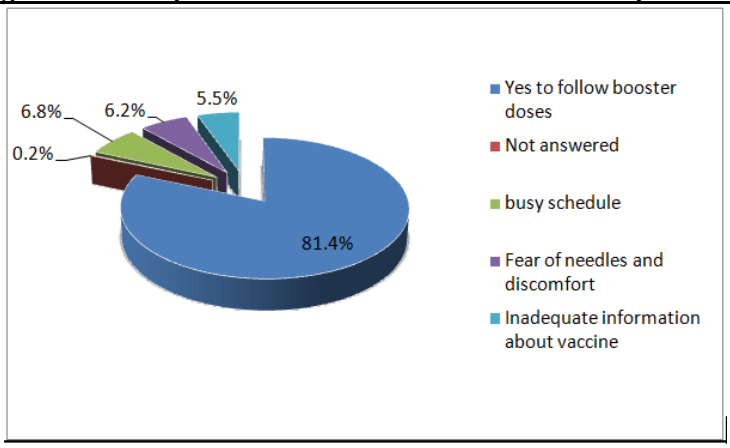


Fig 7: Comparison of vaccines received during childhood and adulthood

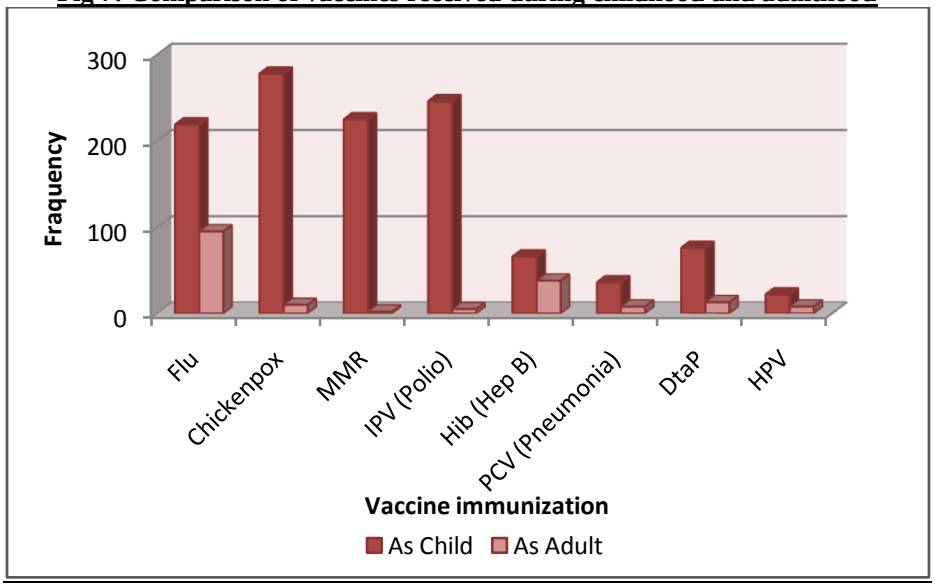
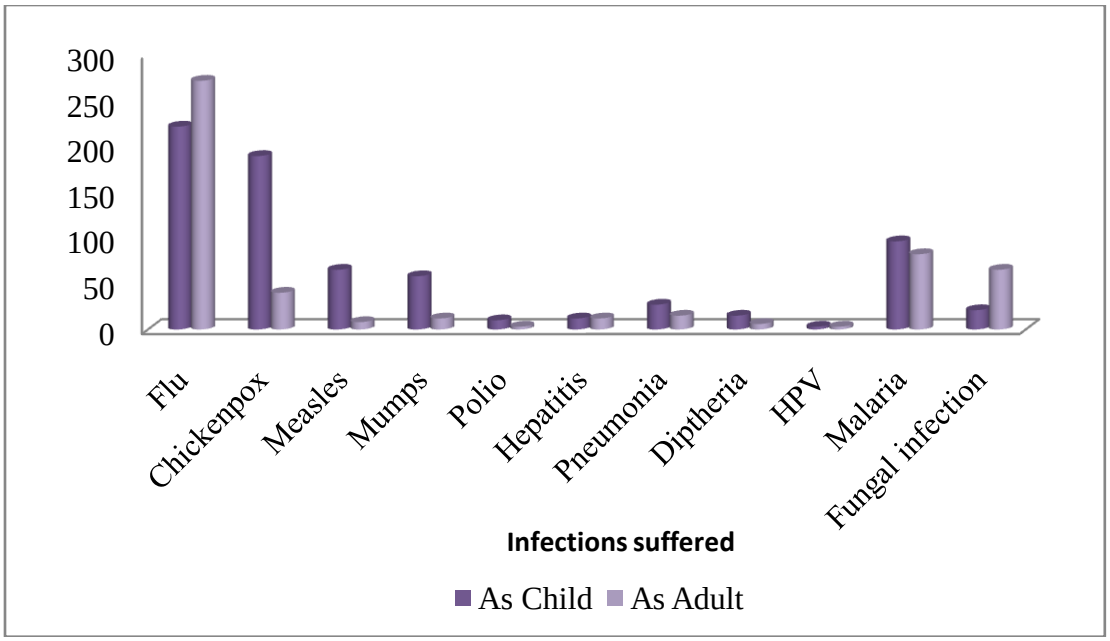


Fig 8: Responses about different infections suffered as children and /or as adults



DISCUSSION

To vaccinate an adult is as important as to vaccinate a child in order to reduce the incidence rates of common infections that occur due to age factor, health conditions, lifestyle, travelling, and occupational risks etc (Verma et al., 2014).

Vaccination has been well acknowledged as the most valued and effective public health measure in order to cope up mortality, morbidity and disability rates in adults as a result of communicable diseases such as Hepatitis A, Hepatitis B, tetanus, measles, mumps, rubella, diphtheria, influenza, pertussis, typhoid, meningitis, chickenpox and pneumonia (Verma et al., 2014). Nevertheless, vaccines should be taken with care in certain medical conditions such as pregnancy, allergic reactions, disorders and chronic illness, past family history, prior or post blood transfusion or immunosuppressive therapy.

In developing countries like Pakistan, communicable diseases are a major cause of the burden on the economy of the country. Although, the spread of diseases in adults is less than in children but because of incomplete vaccination, the emergence of new diseases with severe complications has been increased. Moreover, there is no particular focus on the vaccination of adults (Maddour, 2008). Even in a developed country like US, only about 2% of the population of adult has been vaccinated (Kumar et al., 2009). A number of reasons may account for the differences in adult and childhood vaccination rates such as the ignorance of primary care physicians towards adult vaccination schedules, lack of public awareness and non serious attitude of government health officials.

In the present study, majority (>85%) of the people thought that it is equally important to vaccinate adults and believed that vaccines are safe for health. This indicates a satisfactory level of awareness about vaccination programs and their significance. These results were also found in conformity with the previous survey reports about the knowledge and awareness of vaccination programs (Mansuri et al., 2003; Qidwai et al., 2007). Our results are also in agreement with the report of Valeri et al., (2014) which showed that women are more concerned about their health safety than men.

In the current study, significant association ($p<0.05$) was noticed between the frequency of infections and the factors affecting the immune system efficiency such as sleep disorders, smoking, alcohol intake, persistent anxiety and use of anti-depressives/steroids and cortisones. Impact of sleep disorders on the functioning of immune system

has already been established (Lashley, 2003). Moreover, it is reported that persistent stress conditions such as anxiety and depression could lead to the increased vulnerability to infections (Linn et al., 1981). Likewise, lower immunoglobulin levels and CD8+ cell counts were noticed in smokers by Mili et al., (1991) when compared with non-smokers. Other factors such as excessive alcohol consumption and use of anti-depressives/steroids may also suppress the individual's immunity to combat infections (Romeo et al., 2007; Marshall-Gradisnik et al., 2009).

It is good to note that majority (84.4%) of the selected individuals considered vaccination important during pregnancy. Women are more susceptible to infections during this period and vaccination can prevent the risks to both mother and the newborn however, care should be taken while administrating the live vaccines (such as MMR or Varicella) to the pregnant women (Bozzo et al., 2011).

Although, a satisfactory level of awareness relevant to adult vaccination was observed, concerns were prevalent with respect to the cost of vaccines as 33% of the respondents considered it a reason for why someone should not be vaccinated. Our findings are in line with Zhou et al., (2005) who observed that many people don't go for vaccinations due to the cost of a specific vaccine, phobia of needles or syringes, discomfort, fear of post allergic reactions etc. It is significant to note that 19% of the selected individuals refused to participate in an immunization program with booster doses either because of busy schedules, fear of needles or discomfort and inadequate information regarding vaccine. This may however be improved by disseminating the information regarding the importance of a particular vaccine for e.g. acceptance towards HPV vaccine has been increased with HPV emergence as a dreadful disease (Francis et al., 2011)

Besides a good awareness level about adult vaccinations, it was disappointing to note significant differences in frequencies of childhood immunizations vs adulthood immunizations. This may be because of the prevailing misconception that adults do not need vaccination if they were vaccinated during childhood. These findings strongly suggest the need to train medical health practitioners and to arrange public awareness seminars as significant changes in immunization rates will require commitment of all health care providers and the positive attitude of consumers.

CONCLUSION

Being a country with 53.4% young dependency ratio, emphasis should also be given to initiate adult vaccination programs for masses as the lack of concerns, ignorance and resources may render them needlessly susceptible to serious infections. Media campaigns and mobile immunization teams (MITs) may play a pivotal role in filling a consistent gap between childhood & adult immunization rates.

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