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Knowledge, Attitude and Barriers towards Children Immunization among Women in Selected Rural Primary Health Centres

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This study explored the knowledge, attitude and barriers to children immunization among women in four selected Rural Primary Health Centres. Immunization coverage rates in Nigeria have remained very poor especially in rural communities despite a plethora of programs and strategies. A survey research questionnaire made up of three trajectories (Attitude, knowledge and barriers to childhood immunization) was used in this study (n= 79, mean= 33 +/-6.9years). This study made use of descriptive and inferential statistic. The SPSS software was used to analyze the data. The study indicates that about 80% of the respondents are aware that immunization services are available at primary healthcare centres, but less than half are aware that immunization against polio is meant for children who are 5 years and below. For barriers, about 53% reported they have no confidence in the quality and safety of vaccines being used while 62% reported that health workers are not sufficiently trained. For attitude, most agreed that immunization make children grow healthy (66%). In this study, knowledge of immunization was a better predictor of barriers to immunization ($\beta = 0.633$; $t = 2.108$; $p < 0.05$). Mothers could be motivated to have their children immunized by doubling efforts at enlightening them and by reiterating the benefits of child immunization to pregnant women during ante-natal clinics. Good healthcare facilities and improve personnel services will encourage more uptakes of immunization services.

The prevention of diseases is important in ensuring public health and in reducing maternal and child mortality. It is widely believed among clinicians that the occurrence of disease is prevented than curing them. Immunizations are one of the best means of protection against contagious diseases. Immunization (vaccination) is a way of creating immunity to certain diseases by using small amounts of a killed or weakened microorganism that causes the particular disease. Adegboye, Kotze and Adegboye (2014) reported that under-five mortality in Nigeria is alarmingly high, and many of the diseases that result in mortality are vaccine preventable. According to a report by the Center for Disease Control and Prevention (CDC, 1999), immunization is ranked the number one public health achievement in saving lives in the 20th century. Extant literatures (Luman, Barker, Shaw *et al*, 2005; Niederhauser and Stark, 2005; Stephan, 2007; Molinari, Koasa, Messonnier *et al.*, 2007) suggests that poverty, language usage, education, nativity, race/ethnicity, access to health care, and other factors may contribute to inadequate immunization but as acknowledged by Baker, Dang, Ly, and Diaz (2010), the linkages and relationships among these factors have not been fully explored. However, despite recent success in reducing health inequities in immunization rates in young children (CDC, 2007) among some communities and ethnic groups, immunization rates remain below optimal levels (Smith and Stevenson, 2008 ; Wooten, Luman, Barker, 2007). Among the reasons for slow progress in attaining the goal for reduction in child

mortality in Nigeria are the inequitable access to immunization services, deficient vaccine supplies and equipments (Lambo, 2005). Also, individual, community and systemic factors affect the equitable uptake of childhood immunization in Nigeria, as in other countries in sub-Saharan Africa (UNICEF, 2001). Immunization is one of the most cost effective interventions amongst 32 well understood prevention and treatment interventions that target the goals of the child health (WHO, 2008 as cited by Singh and Narasimha, 2013).

Globally, vaccines are among the most effective preventive health measures in reducing child mortality, morbidity, and disability (Omer, Salmon, Orenstein, deHart and Halsey, 2009; Nyarko, Pence and Debpuur, 2001). Vaccine coverage rates in Nigeria according to WHO (2005), have been persistently below 40 percent since 1997. Another report (Hersh, 2005) shows that Nigeria is among the ten countries in the world with vaccine coverage rates below 50 percent, and as reported by Antai (2010), despite the availability of vaccines to tackle childhood mortality, vaccine preventable deaths remain endemic in the sub-Saharan region. Immunization coverage in many parts of Nigeria is far from optimal, and far from equitable (Antai, 2009). As reported by WHO (2003) and WHO/UNICEF (2005), the establishment of the Global Polio Eradication Initiative in 1988, immunization resulted in about 99 percent reduction in the worldwide incidence of poliomyelitis. By reducing morbidity and mortality, Brenzel, Wolfson, Fox-RushbyJ, Miller and Halsey (2006) posit that immunization will contribute significantly to the achievement of the Millennium Development Goal 4, which is to achieve a two-thirds reduction in mortality rates for children under the age of 5 years between 1990 and 2015.

WHO/UNICEF (2013) reported that the number of children under one year of age who did not receive DTP3 vaccine worldwide was 22.6 million in 2012 compared to 22.3 million in 2011. It was further revealed that more than seventy percent of these children live in ten countries: Democratic Republic of the Congo, Ethiopia, India, Indonesia, Iraq, Nigeria, Pakistan, Philippines, Uganda and South Africa. The United Nations General Assembly Special Session (UNGASS) goals by 2010: (i) Ensure full immunization of children under one year of age at 90% coverage nationally with at least 80% coverage in every district or equivalent administrative unit, (ii) Vitamin A Deficiency Elimination. World Health Assembly (WHA) and UNGASS goals by 2005: (i) Polio Eradication, (ii) Measles Mortality Reduction, (iii) Maternal and Neonatal Tetanus Elimination (MNTE) (Wolfson, Gasse, Lee-Martin, Lydon, Magan and Tibouti *et al.*, 2008).

Comparison of mortality rates recorded in the 2013 NDHS with the estimates from the 2003 NDHS and 2008 NDHS shows that the rates have decreased in all categories. The under-5 mortality rate decreased from 201 deaths per 1,000 live births in 2003 NDHS to 157 deaths per 1,000 live births in the NDHS 2008 has further declined to 128 deaths per 1,000 live births in the 2013 NDHS. However, Nigeria still has a long way to go to achieve the MDG target of reducing the under-5 mortality to 64 deaths per 1,000 live births and the infant mortality to 30 deaths per 1,000 live births by 2015 (Government of Federal Republic of Nigeria, 2010).

The Nigeria Expanded Programme on Immunization (EPI) follows the international guidelines recommended by the World Health Organisation (WHO). According to WHO, a child is considered fully vaccinated if he or she has received a BCG vaccination against tuberculosis; three doses of vaccine to prevent diphtheria, pertussis, and tetanus (DPT); at least three doses of polio vaccine; and one dose of measles vaccine. These vaccinations should be received during the first year of life (NDHS, 2013). According to the 2008 NDHS, 23% of Nigerian children 12–23 months received all recommended vaccines at any time prior to the survey—one dose of BCG and measles and three doses each of DPT and polio. This represents a large increase in vaccination coverage since 2003, when only 13% of children had received all vaccinations (NDHS 2008 Key findings). Vaccination coverage varies widely by residence and zone. Four in ten children in urban areas are fully vaccinated compared to only 16% in rural areas.

Statement of Problems

It was reported in the NDHS (2003) that widespread inequities persist in immunization coverage to the disadvantage of children of parents in the lowest socio-economic quintile, parents with no education, and parents residing in rural areas, especially in the Northern regions. Babalola and Aina (2004) also noted that inequitable access to routine immunization in Nigeria has also been attributed to fear and confusion. As reported by WHO (2014), 22.4 million children were incompletely vaccinated at 12 months of age and remained at risk for vaccine-preventable morbidity and mortality. The result was more disturbing when it revealed that more than half of all incompletely vaccinated children live in India (32%), Nigeria (14%), and Indonesia (7%). Vaccines are one of the best and most cost effective public health interventions known to man. Nigeria is an important country in the immunization world. Nigeria is a large country with high child mortality and low immunization coverage rates. Of the 6 million Nigerian children born every year, more than 1 million fail to get fully vaccinated by their first birthday (IVAC 2012). Current coverage rates for the various childhood vaccines in Nigeria are among the lowest in the world (Babalola & Aina, 2004). For instance, Measles was responsible for 5 percent of the child deaths in Africa (Bryce, Boschi-Pinto, Shibuya & Black, 2005), of an estimated 282 000 deaths in 2003 (Stein, Birmingham, Kurian, Duclos & Strebel, 2005; WHO, 2003); half of these occurred in Nigeria (Hersh, 2005). NDHS (2013) Differentials in the coverage levels show that the proportion of children fully vaccinated is lower for children in rural areas (16 percent) than in urban areas (43 percent) and it is on the background that this study aims to assess mothers' knowledge level, attitude and the barriers to childhood immunization in four primary health centres.

Hypotheses

1. There will be a significant relationship between mothers' educational level, age, attitude and knowledge of childhood immunization
2. There will be a combined and relative contribution of knowledge and attitude on barriers to childhood immunization

Method

Design

This is Knowledge, attitudes and barriers (KAB) study. The design was a cross sectional survey. The study population comprised of mothers in four selected primary health care centres in Ado-Odo Ota Local Government Area of Ogun State. We conducted a bivariate correlation to examine significant associations between socio-demographic variables and the barriers to immunization. Purposive sampling was done to select the sample to be surveyed. Eighty-three (83) participants were selected but only 79 questionnaire forms were fit for analysis. An informed consent documents was completed by each participants. The Knowledge, attitudes and barriers questionnaire (KABQ), which was a researcher developed scale is divided into two sections. The first part dealt with participants socio-demographic details while the second part has 3 subscales measuring attitude, knowledge and barriers to childhood immunization. This part was structured as a 4-point Likert-type rating scale. Some of the attitudinal questions were based on the Health Belief Model. The questionnaire was pilot-tested for comprehensibility and acceptable internal reliability.

Psychometric Features

The KAB Questionnaire was self-designed and the items were generated from the review of literature. Twenty eight (28) items were initially generated but after preliminary study including expert opinions, the items were reduced to 22 and finally to 21 items after the pilot study analysis. The KABQ was pilot tested by administering it to 17 mothers in Iyesi-Ota, a local suburb. These sets of mothers were not part of the final study. The essence was to ensure that the items were not ambiguous and that they were properly worded. The KABQ has discriminant validity with the Family Adaptability and Cohesion Evaluation Scales (FACES IV, Olson & Gorall, 2006). The FACES IV is a

42-item self-report questionnaire measuring cohesion and flexibility. Some sample items in the KABQ include: I believe in childhood immunization, immunization against Polio is meant for children and health workers are not sufficiently trained. The reliability of the KABQ was ascertained by employing the test-retest reliability (three-week interval) method using the Cronbach's Alpha. The test-retest returned a coefficient of 0.72 which was considered adequate for the conduct of the study.

Procedure for Data Collection/Analysis
The questionnaire forms were administered to the participants with the aid of graduate students who were trained as research assistants. The questionnaires were administered and collected on the spot. This ensured 100% response rate. Data was collected from early November through to December 2014. The data were expressed as both descriptive and inferential statistics, such as frequency counts and percentages, analysis of variance (ANOVA) and multiple regressions. A p-value of ≤ 0.05 was considered significant. All statistical analyses were performed using SPSS (SPSS version 17 for Windows, SPSS Inc., Chicago, IL).

Results

Table 1: KAB Scores of Participants (N = 79)

SN	Attitude towards Immunization	Freq	%
1	I believe in childhood immunization	52	66
2	I will do everything to promote childhood immunization	50	64
3	The injection is not injurious to children	43	55
4	It does not cost much from the Government	60	76
5	It makes children grow healthy	52	66
	Knowledge of Immunization		
6	Children should be immunized more than once	56	71
7	Are you aware that immunization services are available at primary health care near you	63	79.7
8	Immunization enhances family stability	35	44
9	Immunization against Polio is meant for children between 0-5 years	38	48
10	Childhood immunization prevents paralysis in children	40	51
	Barriers to Immunization		
11	The health service delivery system is poor in Nigeria	62	78
12	Immunization days is often on working days	49	62
13	The health workers are not sufficiently trained	49	62
14	Immunization is not well funded in Nigeria	55	69
15	I have no confidence in the quality and safety of vaccines being used	42	53

Responses from Table 1 reveal that the participants have a mixed reaction of positive and negative attitudes towards childhood immunization. More than half of the participants reported that childhood immunization prevents paralysis in children (51%), while 48% indicated immunization against Polio is meant for children between 0-5 years. Following the same trend, only 44% indicated that immunization can enhance family stability. However, about 80% of the participants are aware that immunization services are available at primary health care near them. The participants displayed fairly good knowledge of childhood immunization. Sixty-six percent (66%) trusted or believe in childhood immunization while another 66% agreed that immunization makes children grow healthier. For barriers, about 53% reported they have no confidence in the quality and safety of vaccines being used while 62% reported that health workers are not sufficiently trained.

Table 2: Correlation Coefficients of Demographic and Predictor Variables

Variables		Age	Edu Level	Attitude	Knowledge
Age	Pearson Correlation	1	.169	.267(**)	.134
	Sig. (1-tailed)		.068	.009	.119
	N		79	79	79
Educ Level	Pearson Correlation		1	.593(**)	.602(**)
	Sig. (1-tailed)			.000	.000
	N			79	79
Attitude	Pearson Correlation			1	.769(**)
	Sig. (1-tailed)				.000
	N				79
Knowledge	Pearson Correlation				1
	Sig. (1-tailed)				
	N				

** Correlation is significant at the 0.01 level (1-tailed).

Table 2 shows the correlation coefficients among the demographic variables and the predictor variables. The result show a positive and significant relationship between educational level and attitude to immunization (.593, p<.05) and knowledge (.602, p<.05). There was equally a positive and significant relationship between age and attitude to immunization (.267, p<.05) but there was no significant relationship with knowledge (.134, p>.05) and educational level (.169, p>.05). Significant relationship however existed between attitude and knowledge to immunization (.769, p<.05).

Table 3a: Relative Contribution of the Predictors on the Criterion Variable

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta	B	Std. Error
(Constant)	24.733	6.535		3.785	.000
Knowledge	.633	.300	.234	2.108	.038
Attitude	.066	.089	.082	.741	.461

a Dependent Variable: Barriers to Immunization

Table 3b: Contribution of the Predictor on the Criterion Variable and Model Summary of Multiple Regressions[b]

R= .246[a] **R²=** .061 **R² Adj=** .036 **Std Err=** 5.244					
Source	**SS**	**df**	**MS**	**F**	**Sig.**
Regression	135.135	2	67.568	2.457	.092a
Residual	2090.206	76	27.503		
Total	2225.342	78			

a Predictors: (Constant), Attitude, Knowledge
b Dependent Variable: Barriers to Immunization

The multiple regression analysis shows that knowledge of immunization was a better predictor of barriers to immunization (β = 0.633; t = 2.108; p < 0.05). The model summary as presented in Table 3a and b reveals that when the two predictor

variables were entered into the regression model at once, there was no significant combined contribution of knowledge and attitude towards childhood immunization (r = 0.246, r^2 = 0.061: $F_{(2, 76)}$ = 2.457; p>.05). In this study, 3.6 percent of the variation in mothers' barrier to childhood immunization appears to be accounted for by the predictor variables.

Discussion

The research provides interesting findings about mothers' attitude, knowledge and barriers to immunization. This study shows that knowledge of immunization is relatively high with a mix of positive and negative attitude. The barriers as reported in this study include no confidence in the quality and safety of vaccines being used and that health worker are not sufficiently trained. This result corroborates the NDHS 2008. Information from the mothers on the reasons their children were not vaccinated includes lack of information (27 percent) and fear of side effects (26 percent), and the post being located too far away (13 percent). Women in rural areas are more likely to report lack of information on immunisations than women in urban areas (29 percent and 20 percent, respectively). In a study by Matsuda (2002), it was reported that the barriers to immunizing are knowledge about immunization and lack of transportation. The bivariate analyses show a positive and significant relationship between educational level and attitude to immunization 593, p<.05) and knowledge (.602, p<.05). This result corroborates the findings of Matsuda (2002) that the more educated a mother was; the more likely she was to use immunizations as a means of protecting her child or children from disease. Hence, children of mothers with lower or no education have the highest likelihood of not fully immunizing their children.

According to Adegboye, Kotze and Adegboye (2014), the chance of children with a mother with no education being immunized is decreased by 17% compared with children whose mother has at least a primary education and Jamil, Bhuiya, Streatfield, and Chakrabarty (1999) noted that immunization coverage, particularly in the developing world, has been shown to be associated with several socio-economic and demographic factors, such as parental education. Parashar (2005) and Racine & Joyce (2007) reported that a child with one educated parent had an increased likelihood of being appropriately vaccinated and even increased significantly if both parents were educated.

In this study, the finding shows a significant relationship between attitude and knowledge to immunization (.769, p<.05). There was equally a positive and significant relationship between age and attitude to immunization (.267, p<.05) but there was no significant relationship between age and knowledge (.134, p>.05). A study by Adegboye, Kotze and Adegboye (2014) found that children of mothers who are gainfully employed and those of older mothers have higher tendency of embracing immunization. Wang, Wang, Zhang, Kang and Duan (2007) conducted knowledge, attitudes and practices (KAP) study in China to determine mothers' knowledge about immunizations, they found that both the knowledge and coverage were low and were influenced by the mothers' age among other factors.

Conclusion

Childhood immunization is a child's right and it represents the gateway to the provision of comprehensive health care at a formative age. Immunization has been regarded as the most cost effective intervention for child health promotion (WHO, 2004). Extant literature show that Vaccine Preventable Diseases (VPD) are the major causes of childhood mortality in Nigeria and is due to low vaccination uptake, poor health care system, and inadequate or low quality health personnel. This study shows that there are barriers to childhood immunization but this result can be used to target mothers at the rural areas who have lower uptake of immunization. As noted by Jamil *et al.* (1999); and Canavati, Plugge, Suwanjatupporn, Sombatrungiaroen, and Nosten (2011), even in a system where immunization is free, the indirect costs such as transportation may be a deterrent for some mothers to get their children immunized. It is recommended that mothers should be motivated to have their children immunized by doubling

efforts at enlightening them and by reiterating the benefits of child immunization to pregnant women during ante-natal clinics. Good healthcare facilities and improve personnel services will encourage more uptake of immunization services.

References

Adegboye, O. A., Kotze, D., and Adegboye, O. A. (2014). Multi-year trend analysis of childhood immunization uptake and coverage in Nigeria. *Journal of Biosocial Science, 46(2)*:225-39. doi: 10.1017/S0021932013000254.

Antai, D. (2010). Migration and Child immunization in Nigeria: individual and community level contexts. *BMC Public Health, 9(10)*:116.

Antai, D. (2009).Inequitable childhood immunization uptake in Nigeria: a multilevel analysis of individual and contextual determinants. *BMC Infectious Diseases, 9*:181, doi: 10.1186/1471-2334-9-181

Babalola, S. and Aina, O. (2004). *Community and systemic factors affecting the uptake of immunisation in Nigeria: A qualitative study in five states*. Abuja: PATHS- National Report,

Baker, D. L., Dang, M. T., Ly, M. Y., and Diaz, R. (2010). Perception of Barriers to Immunization among Parents of Hmong Origin in California. *American Journal of Public Health, 100(5)*: 839–845. doi: 10.2105/AJPH.2009.175935

Brenzel, L., Wolfson, L. J., Fox-Rushby, J., Miller, M., and Halsey, N. A. (2006). Vaccine preventable diseases. *In Disease control priorities in developing countries*, Edited by Jamison DT, Breman JG, Measham AR, Alleyne G, Claeson M, Evans DB, Jha P, Mills A, Musgrove P. Washington: Oxford University Press and The World Bank.

Bryce, J., Boschi-Pinto, C., Shibuya, K. and Black, R. E. (2005). WHO estimates of the causes of death in children. *Lancet, 365*:1147-1152. doi: 10.1016/S0140-6736(05)71877-8

Canavati, S., Plugge, E., Suwanjatupporn, S., Sombatrungiaroen, S., and Nosten, F. (2011). Barriers to immunization among children of migrant workers from Myanmar living in Tak province, Thailand. *Bulletin of the World Health Organization 89:* 528–31.

CDC (2007). *Eliminate disparities in adult and childhood immunization rates*. Retrieved from http://www.cdc.gov/omhd/AMH/factsheets/immunization.htm

CDC (1999). Impact of vaccines universally recommended for children—United States, 1990–1998. *Morbidity Mortal Weekly Report* (MMWR), *48(12)*:238–243.

Hersh, B. (2005). *Beyond next steps in measles control*. 5th Annual Measles Partners for Measles Advocacy Meeting; Geneva, Switzerland.

International Vaccine Access Center (IVAC, 2012). *Overcoming Barriers to Routine Immunization in Nigeria.* Retrieved from http://dev12.jhsph.nts.jhu.edu/research/centers-and-institutes/ivac/IVACBlog/keyword/nigeria

Jamil, K., Bhuiya, A., Streatfield, K., and Chakrabarty, N. (1999). The immunization programme in Bangladesh: impressive gains in coverage, but gaps remain. *Health Policy and Planning 14*: 49–58.

Lambo, E. (2005). *Achieving the Health Millennium Development Goals in Sub-Saharan Africa: The Role of Science and Technology*. A presentation given at an Africa-Canada-UK Exploration January 30 to February 1, 2005 Canada House, London.

Luman, E. T., Barker, L. E., Shaw, K. M., McCauley, M. M., Buehler, J. W., and Pickering, L. K. (2005). Timeliness of childhood vaccination in the United States: days undervaccinated and number of vaccines delayed. *JAMA, 293(10)*:1204–1211.

Matsuda, D. (2002). *Beliefs about Immunization and Children's Health among Childbearing Mothers in Nepal*. Senior Honours Thesis in Human Biology.

Molinari, N. A., Koasa, M., Messonnier, M. L. and Schieber, R. A. (2007). Out-of-pocket costs of childhood immunizations: a comparison by type of insurance plan. *Pediatrics, 120(5)*:e1148–e1156.

Niederhauser, V. P. and Stark, M. (2005). Narrowing the gap in childhood immunization disparities. *Pediatric Nursing, 31(5)*:380–386.

National Population Commission (NPC): *Nigeria Demographic and Health Survey (NDHS, 2003)*. Calverton, Maryland: National Population Commission and ORC Macro; 2004.

National Population Commission (NPC): *Nigeria Demographic and Health Survey (NDHS, 2008)*. Calverton, Maryland: National Population Commission and ORC Macro.

National Population Commission (NPC): *Preliminary Report: Nigeria Demographic and Health Survey (NDHS, 2013)*. MEASURE DHS, ICF International. Calverton: Maryland.

Nyarko, P., Pence, B. and Debpuur, C. (2001). Immunization status and child survival in rural Ghana. *Population Research Division Working Paper No. 147*, Population Council, New York.

Olson, D. H. & Gorall, D. M. (2006). *Family Adaptability and Cohesion Evaluation Scales* (Faces Iv). Retrieved from http://www.facesiv.com/pdf/3.innovations.pdf

Omer, S. B., Salmon, D. A., Orenstein, W. A., deHart, P. and Halsey, N. (2009). Vaccine Refusal, Mandatory Immunization, and the Risks of Vaccine-Preventable Diseases. *The New England Journal of Medicine, 360*:1981-8.

Parashar, S. (2005). Moving beyond the mother-child dyad: women's education, child immunization, and the importance of context in rural India. *Social Science & Medicine, 61*: 989-1000.

Racine, A. D. and Joyce, T. J. (2007). Maternal education, child immunizations, and public policy: evidence from the US National Immunization Survey. *Social Science & Medicine, 65*: 1765-72.

Siddiqi, N., Siddiqi, A., Nisar, N. and Khan, A. (2010). Mothers knowledge about EPI and its relation with age-appropriate vaccination of infants in peri-urban Karachi. *Journal of Pakistan Medical Association, 60(11)*:940-944

Singh A, Narasimha Murthy B (2013) Lot Quality Assurance Sampling for Monitoring and Evaluation of Immunization Coverage in District Solan, Himachal Pradesh, India, 2011. *Journal of Community Medical Health Education, 4*:259. doi: 10.4172/2161-0711.1000259

Smith, P. J. and Stevenson, J. (2008). Racial/ethnic disparities in vaccination coverage by 19 months of age. An evaluation of the impact of missing data result from record scattering. *Statistics in Medicine, 27(20)*:4107–4118.

Stein, C. E., Birmingham, M., Kurian, M., Duclos, P. and Strebel, P. (2003). The global burden of measles in the year 2000 - a model that uses country-specific indicators. *Journal of Infectious Diseases, 187(suppl 1)*:S8-14.

Stephan, C. L. (2007). Immunization registries: use of race and ethnicity, and socioeconomic status indicators to identify immunization disparities. *AMIA Annual Symposium Proceedings,* 1124.

United Nations Children's Fund (UNICEF, 2001). *The State of the World's Children*. New York: UNICEF

Wang, Y. Y., Wang, Y., Zhang, J. X., Kang, C. Y., Duan, P. (2007). Status of mother's KAP on child immunization in minority areas, Guizhou Province [Article in Chinese]. *Beijing Da Xue Xue Bao, 39*: 136-9.

Wolfson, L. J., Gasse, F., Lee-Martin, S-P, Lydon, P., Magan, A., Tibouti, A., Johns, B., Hutubessy, R., Salama, P. and Okwo-Bele, J. M. (2008). Estimating the costs of achieving the WHO–UNICEF Global Immunization Vision and Strategy, 2006–2015. *Bulletin of the World Health Organization, 86*: 27-39.

Wooten, K. G., Luman, E. T. and Barker, L. E. (2007). Socioeconomic factors and persistent racial disparities in childhood vaccination. *American Journal Health Behaviour, 31(4)*:434–445.

World Health Organization (WHO, 2014). *Global routine vaccination coverage 2011*. Published in the *Weekly Epidemiological Record*. Retrieved from http://www.who.int/immunization/documents/vaccination_coverage/en/

World Health Organization (WHO, 2005): Progress in reducing global measles deaths: 1999-2003. *Weekly Epidemiological Record, 80*:78-81.

World Health Organization (2004). *WHO Media Center. Global Alliance for Vaccines and Immunization (GAVI)*. Retrieved from URL: http://www.who.int/entity/mediacentre/factsheets/en.

World Health Organization (WHO, 2003). *Report of the eight meeting of the Technical Consultative Group (TCG) on the Global Eradication of Poliomyelitis*, Geneva, Switzerland.

WHO/UNICEF (2013). For the coverage, estimates and estimation of number of children vaccinated or not vaccinated. *Coverage estimates 2012* revision. Retrieved from http://apps.who.int/immunization_monitoring/globalsummary/timeseries/tswucoveragebcg.html

WHO and UNICEF (2005). *Global immunization vision and strategy, 2006-2015*. Geneva, Switzerland and New York, USA: WHO and UNICEF.