Reporting Data and Household Survey Data in Monitoring and Evaluation District Immunization Coverage in Pakistan

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Abstract: Monitoring immunization coverage is increasingly important to the government of Pakistan and development agencies to evaluate the progress and the success of the Expended Program of Immunization (EPI), which sustainability is unstable. The aim of this study was to compare the DPT3 coverage obtained by two methods: EPI reporting system data and UNICEF household survey data at district-level available from 140 districts throughout Pakistan. There comparable data were available in 34 districts in 1999; 72 districts in 2000; and 34 districts in 2002. We found that the reporting data do not correspond with the household data in terms of DPT3 coverage except for the data of 2002 from 34 districts. On average the district-level DPT3 rates from reporting data was about 14 % higher than the household survey data, i.e., 77.1 % versus 62.8 %. These findings indicated that the immunization data from household survey should be used in program organizing and planning whenever applicable and the interpretation of data from the EPI reporting system should be done with due precautions.

Key words: Immunization coverage, Reporting data, Household survey data, Pakistan

Introduction

The Expanded Program on Immunization (EPI) of Pakistan was one of the most successful programs in the early 80s but its vaccination coverage decreased substantially in the mid 90s. (UNICEF, 2000). To increase the coverage and improve the program objectives -- to reduce morbidity and mortality from the six vaccine preventable diseases -- the government of Pakistan, Department of Health and donor agencies were diligent in intensifying intervention and increasing program inputs. Monitoring immunization coverage has become an increasingly important task of the government and donor organizations to evaluate progress and improvement of the program. To monitor and evaluate the progress of the program, the federal EPI cell developed a routine immunization reporting system for every district measuring EPI vaccination coverage periodically. The reporting system starts from the basic health unit, to either district-level or sub-district-level where coverage data were reported to its respective province. Each province sends individual district data to the federal EPI cell that is housed in the National Institute of Health. The quality of data in the reporting system has been a major concern over whether they measure "actual" vaccination coverage, as reporting data often suffer from mistake in recording, lack of appropriate means for data storing and reporting and inconsistency within and among the district reporting systems.

In 2000, 2001 and 2003, the United Nations Children's Fund (UNICEF) conducted three rounds of a household survey for an independent and credible Third Party Evaluation (TPE) of the EPI coverage (UNICEF, 2000 and UNICEF, 2002). The survey was designed using the World Health Organization (WHO) standard for EPI evaluation called 30 Cluster-Sampling Technique. Survey data, while generally accepted to be the more credible than data from a reporting system, are not invariably accurate. However, the WHO technique compares well with data from the national representative survey, such as Demographic and Health Survey (DHS) and is the common way of obtaining coverage data (Gauri, V. and P. Khaleghian, 2002). Nonetheless there were much fewer household surveys compared to reporting system data and policy makers and planners might be inclined to use its data because of its scarcity. We question the extent to which there is an empirical association between the Federal EPI Reporting System data and UNICEF Household Survey data on routine EPI coverage.

Table 1: Unicef's Household Surveys for Expended Program of Immunization (EPI)

Province	Survey 2000 Coverage 1999	Survey 2001 Coverage 2000-1	Survey 2003 Coverage 2002
Punjab	+	-	+
Sindh	-	+	-
Balochistan	-	+	-
NWFP/FATA*	-	+	-
AJK**	-	-	-

*NWP/FATA: North Western Frontier Province and Federal Administered Tribal Area
**AJK: Azad Jammu and Kashmir

Materials and Methods

The objective of our analysis was to find the extent to which national variations in the size of DPT3 coverage, as reflected in the reported data, agree with national variations in the size of DPT3 coverage according to a well-established measure, reflected in the household survey data. We compared the Federal EPI Reporting System data with UNICEF household data in 140 districts. The reporting data of DPT3 coverage at district-level in 1999 were compared with data from the UNICEF TPE household survey in July 2000 that evaluated the 1999 coverage available from 34 districts throughout the province of Punjab. We also compared the 2002 EPI reporting system data with the UNICEF data from a household survey in April 2003 that evaluated the 2002 coverage, among the 34 districts. The DPT3 district-level coverage of EPI reporting system in 2000 from 67 districts in Balochistan, Sindh and NWFP/FATA, were also compared with the 2001 UNICEF household survey that assessed the 2000 coverage of DPT3.

The EPI reporting system is housed in the National Institute of Health and the operational level is the health unit that reports to district (or sub-district), then to the province before they were send to the federal EPI cell. This system is based upon a register system, in which permanent registers record children and women once and daily registers record and update vaccination for the patient. The coverage survey was conducted in 30 clusters in each district. Each cluster contains at least 7 children age between 12 and 23 months old for evaluating the immunization coverage. We used the absolute % values of the DPT3 coverage.

Results

We found that in the majority of the districts (71 %) in our sample, the DPT3 district -level coverage in EPI reporting system over-estimated the UNICEF household survey data. On average the district-level DPT3 rates from reporting data was about 14 % higher than the household survey data (77.1 % versus 62.8 %, p=0.000).

We examined the data closer and found that Rajanpur district is an outlier that could influence the lack of association. Until recently, Rajanpur was a remote southern part of DG Kan districts that presented difficult access and low coverage. It was separated from DG Khan and became a new district shortly before the survey was conducted. However, when this district was excluded from the sample, the results of the analysis remain unchanged. DG, khan for example, has a high 1999 DPT3 coverage according to EPI reporting system, whereas the household survey show much lower coverage. The district that exhibits close to perfect equality between EPI reporting system and UNICEF household survey is Kasur, where the 1999 DPT3 coverage was about 76 %.

In the analysis of the 2000 DPT3 coverage in 67 districts of Balochistan, Sindh and NWFP/FATA , we found some weak correspondence among districts in three provinces of Pakistan between the federal EPI reporting system data and the UNICEF household survey data on the 2000 DPT3 immunization coverage. We also verified the data for the unusual observation that might influence the correlation coefficient of the model. Nonetheless we did not find any outlier that has unusual strong influence or high leverage. However when, the analysis was controlled for the overall % of unreachable children under five years old in the district the level association between the EPI reporting system data and the UNICEF survey data on DPT3 coverage diminished and the significance disappeared.

The results of our analysis showed strong correspondence between the EPI reporting system and UNICEF household survey among 34 districts in 2002 data. We also carefully verified the data to see if there is any unusual outlier observation that might affect the overall outcome and cause the significant association. We found that Mandi B. Din and DG Khan had high-leverage that might have too much influence on the resulting analysis. Nevertheless, after removing these districts from the sample and recomputing the analysis, the correlation coefficient and its level of significant had changed negligibly compared to the previous analysis. When the analysis was controlled for the overall % of unreachable children under five years old in the district, the significant association between the EPI reporting system data and the UNICEF survey data on 2002 DPT3 coverage remains unchanged.

Discussions

In this study we found some correspondence between the EPI reporting system data and UNICEF household survey data on DPT3 coverage rate at the district level. The data allowed us to make the comparison in different points of time, 1999, 2000 and 2002. Comparison the 1999 DPT3 coverage data showed no correspondence between the two sources of data and the level of association became weaker after the analysis was controlled for the % of unreachable children under five years of age and removing an outlier district (Pearson's correlation = 0.10, p=0.609). Moreover, the reporting system excessively (67 %) over estimated the actual coverage recorded in household survey. The analysis of 2000 data indicated weak improvement of the association between the EPI reporting system and the UNICEF household survey. There was some weak correspondence between two sources of data regarding 2000 DPT3 coverage rate at the district-level (Pearson's correlation = 0.29, p=0.017), that eventually disappeared after the analysis was controlled for the % of unreachable children under five years of age in the district (Pearson's correlation = 0.11, p=0.40). The most recent data, 2002, showed remarkable improvement of the reporting system, at least in 34 districts

that the DPT3 survey data were available. The result of the study indicated that association between the reporting system and the household survey was good and it remained quite stable even after controlling for the % of unreachable children under five years of age at the district-level and removing two outliers districts (Pearson's correlation = 0.58, p=0.002).
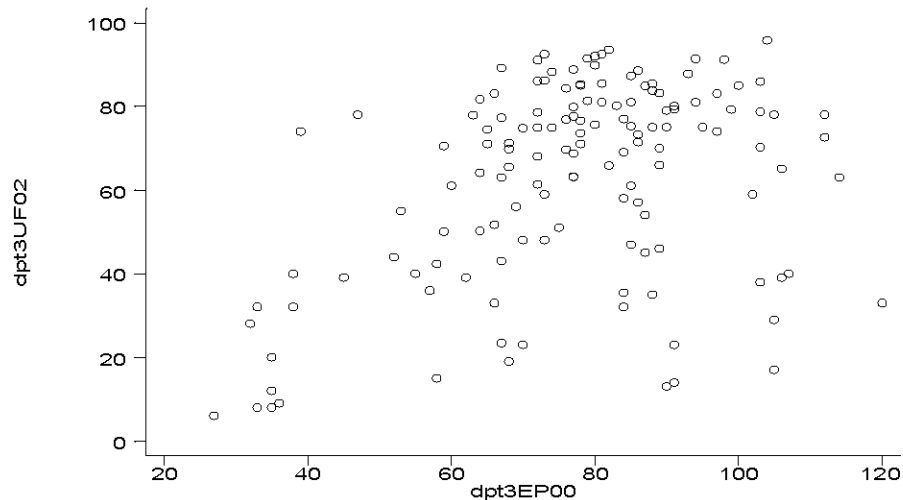

Fig. 1: Comparison the DPT3 coverage between the EPI reporting system data and Household Survey data in140 districts

There are many explanations for the discrepancy between reporting data and survey data. The reporting system often uses underreported and out-of-dated denominators and disregards the mobility of the population. In the situation of Pakistan, the uncounted refugee coupled with the lack of up-to-date census data, especially among tribal populations made the denominators usually smaller than they actually were. The Data Quality Audit performed for Global Alliance for Vaccines and Immunizations (GAVI) confirmed the widespread overall overestimated coverage in Pakistan in reporting system at all levels, district, provincial and national (Global Alliance for Vaccines and Immunizations, 2001). The quality of the reporting system is substantially poorer (53 % as rated by GAVI) as the recording was incomplete and missing, then lacked credible back up and transfer procedure of data files and did not have a monitoring and evaluation mechanism. In addition, the EPI reporting procedure lacked standardized format throughout the system; as health units used different formats to report monthly coverage to their district; and districts, in turn used different formats to report their data to provinces.

Monitoring data on immunization coverage gives support to policies that aim to improve the coverage of six vaccine preventable diseases and reduce morbidity and mortality that are associated with those illnesses. Unfortunately, the most available data, from EPI reporting system, did not capture the actual coverage rate, even though it had shown some improvement. However, we would like to remain optimism and encourage government and donor agencies to continue working to improve the reporting system. Nonetheless, we do share the concerns of the others (Global Alliance for Vaccines and Immunizations, 2001), for its credibility for monitoring and evaluating the progress and success of the EPI program turn out to be very limited. Therefore, we strongly recommend using household survey coverage data, when ever applicable.

References

UNICEF, 200. Third party evaluation of expanded program on immunization in Punjab. UNICEF Country office, Islamabad, Pakistan.

UNICEF, 2000. Coverage evaluation survey of 2002 expanded program on immunization in Sindh, Balochistan, NWFP and FATA . UNICEF Country office, Islamabad, Pakistan.

UNICEF, 2002. Coverage evaluation survey of 2002 expanded program on immunization in Punjab – [Unpublished]. UNICEF Country office, Islamabad, Pakistan.

Gauri, V. and P. Khaleghian, 2002. Immunization in developing countries, its political and organizational determinants. World Bank's Policy Research Working Paper No. 2769.

Global Alliance for Vaccines and Immunizations, 2001. The data quality audit for Pakistan – [Final report]. GAVI Secretariat, Geneva, Switzerland.