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Safety Monitoring of a New Pentavalent Vaccine in the Expanded Programme on Immunisation in Ghana

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Abstract

Background and objective: Safety monitoring of vaccines used in expanded programmes on immunisation is important in all countries, including those with limited resources. As the rates of target diseases decrease, parents become less accepting of even minor common adverse events. Identification, detection, prevention and appropriate communication of adverse events following immunisation (AEFI) are therefore essential to preserve the integrity of immunisation programmes and protect public health. The objective of this study was to document the occurrence of common minor AEFI associated with a newly introduced pentavalent vaccine for routine immunisation in Ghana's expanded programme on immunisation.

Methods: A prospective descriptive study on AEFI associated with the administration of a pentavalent diphtheria, tetanus, pertussis, hepatitis B and *Haemophilus influenzae* type B (DTP-hepatitis B vaccine/Hib vaccine) vaccine that is part of the Expanded Programme on Immunisation was carried out in four locations in Accra, Ghana. These locations were the nation's premier teaching hospital (the Korle-Bu Teaching Hospital) two urban polyclinics (the Mamprobi and Ussher Town polyclinics) and a community immunisation centre (the Zongo Junction Immunisation Centre).

A total of 406 infants were recruited for the study. Upon receipt of signed informed consent from the parents/guardians of the infants, the parents/guardians were supplied with a pink card that functioned as a pseudo-diary for recording AEFI that occurred at home and for measuring and noting the sizes of any injection-site swellings that might occur. It also enabled each participant to obtain free medical care at the Department of Child Health, Korle-Bu Teaching Hospital for the duration of the study (from September 2003 to December 2004) and until the child was 12 months old. Information about the occurrence of AEFI was

actively solicited during each visit for immunisation and also at a visit 4 weeks after administration of the last dose of pentavalent vaccine, when participants were asked to report to the respective immunisation centres for the specific purpose of reporting any AEFI which might have occurred in the intervening period. These AEFI were analysed separately from those reported to the dedicated hospital unit at the Department of Child Health, Korle-Bu Teaching Hospital, since the AEFI reported to that unit were all verified and recorded by trained physicians.

Results: Of the 406 infants, 368 completed the study, whereas 38 defaulted or were lost to follow-up. There were 104 attendances to report cases of suspected AEFI requiring physician attention at the Department of Child Health, Korle-Bu Teaching Hospital. These attendances were made by 74 patients who reported 190 events; notable among these were cough (26.3% of all AEFI reported to the hospital), fever (17.4%), common cold (12.1%), vomiting (7.4%) and diarrhoea (6.8%). Three of these visits involved AEFI that were classified as 'serious', since they required hospitalisation, but all three were considered to be unlikely to be related to vaccine administration. In addition, actively solicited information on AEFI following immunisation from 921 individual interviews with the parents/guardians of immunised infants during the follow-up visits resulted in reports of 259 events being reported, the most common, according to crude incidence rates, being fever (14.7%), common cold (3.8%), crying (3%) and cough (2.8%).

Conclusion: The results of this study show agreement with safety studies on vaccines containing identical or similar antigens performed elsewhere and indicate the safety and tolerability of the pentavalent DTP-hepatitis B vaccine/Hib vaccine in Ghanaian children.

Background

Immunisation programmes are one of the remarkable medical achievements of the past century. As a result of national immunisation programmes, several communicable diseases have been controlled and some have been eliminated, e.g. smallpox.[1] Therefore, immunisation has been, and continues to be, one of the cornerstones of public health programmes in all countries. The success of national immunisation programmes has ensured that vaccine-preventable diseases are now less visible and more attention is now being focused on the adverse events that may follow immunisation. The occasional severe adverse event or cluster of adverse events associated with the vaccines used in national immunisation programmes may rapidly become a serious threat to public health.[2] When such events are associated (rightly or not) with the national immunisation programme, they may undermine public confidence and erode the gains made by the programme.[3] It is therefore essential that nationwide monitoring and reporting systems for vaccine safety are efficient and adequately coordinated to deal with such events and also to respond promptly and appropriately to public concerns. This includes rapid evaluation of the risk to public safety when adverse events do occur, and the taking of appropriate and timely action to minimise such risks.[4]

In Ghana, all national immunisation programmes are coordinated by the Expanded Programme on Immunisation (EPI), which is under the governance of the Institutional Care Division of the Ghana Health Service. The national schedule for routine infant immunisation is shown on table I. Immunisation for specified communicable diseases, including diphtheria, tetanus, poliomyelitis, tuberculosis and measles, is free to all children.

Table I. Ministry of Health/Ghana Health Service Immunisation Schedule for Infants

Age of infant	Diseases targeted	Vaccines administered
At birth	Tuberculosis, polio	BCG; oral poliovirus vaccine
6 weeks	Diphtheria, pertussis (whooping cough), tetanus, hepatitis B, *Haemophilus influenzae* type B, polio	DTP-hepatitis B vaccine/ Hib vaccine; oral poliovirus vaccine
10 weeks	Diphtheria, pertussis (whooping cough), tetanus, hepatitis B, *Haemophilus influenzae* type B, polio	DTP-hepatitis B vaccine/ Hib vaccine; oral poliovirus vaccine
14 weeks	Diphtheria, pertussis (whooping cough), tetanus, hepatitis B, *Haemophilus influenzae* type B, polio	DTP-hepatitis B vaccine/ Hib vaccine; oral poliovirus vaccine
9 months	Measles, yellow fever	Measles vaccine; yellow fever vaccine

BCG = Bacillus Calmette-Guerin; **DTP** = diphtheria-tetanus-pertussis; **Hib** = *Haemophilus influenzae* type B.

Vaccines for the EPI are obtained chiefly through the United Nations Children's Fund or under the World Health Organization (WHO) pre-qualification scheme. Facilities for testing the quality and immunogenicity of vaccines exist in the country, of particular note is the facility at the University of Ghana, but vaccines procured by or for the EPI are not subject to routine laboratory testing within Ghana.

Since Ghana imports vaccines, the functions of the national drug regulatory agency (the Food and Drugs Board [FDB]) are restricted to licensing and post-market surveillance.[4] Whilst all vaccines in the country are licensed by the FDB, its ability to carry out post-market surveillance is limited due to financial and human resource constraints. Furthermore, the absence of reliable nationwide data on the occurrence of AEFI limits the ability of the EPI to respond, fully and with certainty, to queries relating to the safety and quality of vaccines in Ghana's national EPI.

Vaccines are generally considered to be very safe, in that the risk they pose to patients is low. Despite this, vaccine-related adverse events and vaccination-associated events (the so-called programmatic errors) are well known and documented.[5] However, what is needed in all countries, including resource-limited ones like Ghana, is a system for monitoring the safety and quality of vaccines to ensure that the expanding immunisation coverage and consequent fall in incidence of vaccine-preventable diseases are not derailed as a result of either unfounded rumours about AEFI, or worse still, the absence of reliable data for policy making in immunisation. A functional and active system for monitoring AEFI is therefore critical to the success of the national EPI and for the protection of public health.

In 2002, Ghana's EPI introduced a pentavalent vaccine (commonly called the 'five-in-one') for immunising children against diphtheria, tetanus, pertussis (DTP), hepatitis B and *Haemophilus influenzae* type B (Hib). The vaccine, which is administered at 6, 10 and 14 weeks of age, permitted the introduction of two new antigens – HepB and Hib – into the routine EPI. The pentavalent vaccine replaced the trivalent DTP vaccine. While DTP has been used extensively in Ghana, there was very little experience with the use (and safety in routine use) of DTP-hepatitis B vaccine/Hib vaccine in the country. Although the safety profile of each of the individual components of the pentavalent vaccine is known and documented,[5] there is relatively little information on the safety of the components when combined as a pentavalent vaccine, even though studies in the literature indicate a favourable safety profile.[6-9] There is no information whatsoever to suggest that the pentavalent vaccine is associated with more adverse events than those caused by the individual components, but concerns about combination vaccines and their purported, although unproven, association with increased incidences of specified disease conditions have been raised elsewhere, notably in relation to the measles, mumps and rubella vaccine.[10] However, since the pentavalent vaccine is new in Ghana, it is important to carry out studies to ascertain its safety status through usage in the country, especially more so in the early years after its introduction. This need is imperative when one considers the fact that there was, at the time of its introduction, no national

system for monitoring AEFI. Monitoring of AEFI for the pentavalent vaccine was therefore initiated to achieve a dual purpose – to obtain information on the incidence of common AEFI with the pentavalent vaccine, as well as to strengthen the nascent AEFI system that was set up a year after the pentavalent vaccine was introduced.

The aims of this study were to document the AEFI associated with the DTP-hepatitis B vaccine/Hib vaccine during routine immunisation in four settings (a teaching hospital; two urban polyclinics; and a community immunisation centre) and to carry out case causality assessment of serious AEFI. The original design of a comparative study examining differences in AEFI following administration of DTP versus DTP-hepatitis B vaccine/Hib vaccine was abandoned (see 'Discussion' section) because of an absence of data on AEFI following DTP administration.

Methods

Study Design

This was a prospective, purely observational study of AEFI in infants administered DTP-hepatitis B vaccine/Hib vaccine in line with normal EPI guidelines in Ghana. The study was undertaken between September 2003 and December 2004 and was carried out in line with the principles of the Helsinki Declaration on research involving human subjects. Ethical approval for the study was obtained from the Ethics and Protocol Committee of the University of Ghana Medical School and then patient recruitment was initiated.

The study design originally envisaged the recruitment of 150 patients, in order to compare AEFI with the pentavalent vaccine to those with the previously used DTP vaccine. This calculation was based on the premise that if symptoms similar to AEFI occur in 10–50% of children prior to immunisation (control group situation), a 20–50% difference in the occurrence of these symptoms following immunisation (vaccine group situation) can be detected with a 95% confidence and 80% power using a sample-size of 150 participants. This sample size allows for a 20% rate of participant withdrawal from the study. However, due to the lack of availability of reliable AEFI data for DTP use in Ghana, the study design was changed to a purely descriptive one with the number of patients enrolled based on the number of infants with parents/guardians willing to provide written informed consent and the length of funding for the study (12 months).

Study Vaccine

The study vaccine consisted of the quadrivalent powder containing DTP-hepatitis B vaccine (Tritanix® [1], SB Biologicals, Belgium), which was reconstituted with a diluent containing Hib vaccine (Hiberix®, SB Biologicals, Belgium) immediately before administration.

Inclusion Criteria

All infants presented by their parents/guardians for routine immunisation with the pentavalent vaccine in line with EPI guidelines and for whom the parents/guardians were willing to give parental consent for participation, were enrolled for the study. Those excluded from the study were children with an acute illness at the time of enrollment; those with chronic illnesses and/or congenital disorders; and those known or suspected to have impaired immune function. Inclusion and exclusion criteria were in line with EPI guidelines for immunisation and were assessed at the administration of each dose of vaccine.

Collection of Data on Adverse Events Following Immunisation (AEFI)

The aim of the study was explained to parents/guardians who presented their infants for routine immunisation, and those willing to provide signed informed consent were recruited, assigned a unique trial number (UTN) and then given a pink 'AEFI card' with their UTN stated on it. This card acted as a pseudo-diary card that carers were taught to use to

1 The use of trade names is for product identification purposes only and does not imply endorsement.

measure the sizes of any injection-site swellings that may occur. The card also had another important function, as it identified the carrier as a participant in the AEFI Study and thus provided prompt access to free medical care at the Department of Child Health, Korle-Bu Teaching Hospital, from the time of recruitment until the child was 12 months of age. This was to ensure optimum care for participants and also to permit the capture of all significant post-immunisation medical events. Recruitment of patients was therefore deliberately restricted to sites in reasonably close proximity to the teaching hospital. Parents and guardians were encouraged to report any event they felt unduly concerned about to the hospital unit and these visits were not considered to be hospitalisations; the only visits that were considered to be hospitalisations were those where the attending physicians detained the child or admitted them to hospital during the management of the presenting condition.

After administration of each dose of the pentavalent vaccine, parents/guardians were reminded to either record (on the pink card) or report any potential adverse events that may occur to the study team or the hospital. At subsequent immunisation visits, each parent/guardian was interviewed about the occurrence of any possible adverse events that occurred following the administration of the previous dose of the vaccine and whether the child had received care in any health institution in the intervening period. The medical records of children reporting to the Department of Child Health were regularly collected by the study team and all medical events entered into the study records of the child. An in-house Microsoft Access™ database was developed for storing the details of any AEFI and all known medical records of all of the participating patients.

Parents/guardians who did not attend scheduled appointments for immunisations were followed up by way of telephone calls or home visits.

Participants were encouraged to report to the Immunisation Centre 4 weeks after administration of the last dose of the pentavalent vaccine in order to record any adverse events that might have occurred after the last dose was administered. The participants were each given an honorarium of 20 000 cedis (~$US2.20) per visit to the immunisation centre to cover transportation costs.

The AEFI monitored included:

1. The immediate reactogenicity (reactions within 30 minutes after each injection, with an emphasis on allergic reactions). This was done by the study research assistants.
2. Systemic and local reactions, including redness (>2cm measured by a ruler), swelling (>2cm measured by a ruler) and induration (>2cm measured by a ruler). Fever was defined as an axillary temperature of ≥38.5°C measured with a thermometer. However, fever reported by parents/guardians was subjective in that it related to a report of 'high' temperature by the parents/carers. It was not feasible to provide thermometers or training for parents/carers on measuring temperatures at home as part of the study.
3. Any adverse events, deemed to be vaccine-related or not, that resulted in a visit to a physician or that occurred between visits.
4. Any serious adverse events (life-threatening, resulting in death, hospitalization or prolongation of hospitalisation etc), deemed to be vaccine-related or not, that occurred during the study period.

The Brighton Collaboration Case Definitions were not utilised in the study since at the time of study design and initial implementation most of the definitions for the expected AEFI had not been published. The terminologies used in this article are those employed by the attending physicians.

Causality Assessment

After the examination of each AEFI report, the causality of the reported AEFI was assessed by the principal investigator (a clinical pharmacologist) and a consultant paediatrician (the causality team) using an unstructured approach. AEFI were also assessed by the National Advisory Committee on Vaccine Safety during their scheduled meetings. Both the causality team and the National Advisory Committee used the WHO Causality Grading[11] of 'certain', 'probable', 'possible', 'unlikely'; 'conditional/unclassified'; 'unassessable/unclassifable'.

Table II. Disposition of the patients enrolled in the study of the pentavalent diphtheria-tetanus-pertussis-hepatitis B vaccine/ *Haemophilus influenzae* type B vaccine.

Venue	No. recruited	No. completing study	No. of defaulters
Zongo Junction Immunisation Centre	202	202	0
Korle-Bu Teaching Hospital	32	22	10
Ussher Town Polyclinic	64	52	12
Mamprobi Polyclinic	108	92	16
Total	406	368	38

Every single AEFI was examined by the causality team and gradings were assigned only to those AEFI that were considered serious in accordance with the CIOMS definitions for serious adverse reactions.

Calculation of Incidence Rates

Crude incidence rates were calculated as the number of parent interviews at which a specific adverse event was reported divided by the total number of interviews, multiplied by 100/1 to give a percentage.

Results

Number of Participants

A total of 406 infants were recruited for the study. Of this number, 368 children, including 155 boys and 213 girls, completed the study, whereas 38 defaulted or were lost to follow-up. A total of 202 children were recruited from Zongo Junction, 108 were recruited from Mamprobi Polyclinic, 64 from the Ussher Town Polyclinic and 32 from the maternity department of the Korle-Bu Teaching Hospital (table II).

Reports of AEFI

There were 104 visits to the Department of Child Health by 74 patients with 190 various AEFI: 52 patients visited the hospital only once, while 15 patients visited twice and six patients visited three times. One patient visited the hospital four times during the study period. The AEFI reported are shown in table III.

Causality assessment of the three serious AEFI indicated that they were unlikely to be related to vaccine administration (table IV).

One of the four reactions reported as 'swelling' in the vicinity of the injection site on the lateral aspect of the left thigh was actually an injection site abscess that measured 2.5cm × 3.5cm and occurred 6 days after the first dose of the pentavalent vaccine. The abscess responded to treatment with oral cloxacillin and the patient received the second and third doses without any adverse events. Redness and induration were neither recorded by patients nor reported to hospital.

In addition to events reported to the hospital, 259 other AEFI were reported by parents/guardians during 921 individual follow-up interviews held at the time of subsequent immunisations and 4 weeks after the last immunisation (table V). It is worth pointing out that not all of the 368 parents/guardians provided answers about AEFI at every visit, due to reasons

Table III. Adverse events following immunisation (AEFI) with the pentavalent diphtheria-tetanus-pertussis-hepatitis B vaccine/ *Haemophilus influenzae* type B vaccine that were reported to the hospital

AEFI	No. of reports (% total reports)
Cough	50 (26.3)
Fever	33 (17.4)
Cold/nasal discharge	23 (12.1)
Diarrhoea	14 (7.4)
Vomiting	13 (6.8)
Rash	10 (5.3)
Breathing difficulty/noisy breathing	8 (4.2)
Ear discharge	7 (3.7)
Eye discharge	4 (2.1)
Boils	4 (2.1)
Excessive crying	4 (2.1)
Poor appetite	4 (2.1)
Swelling	4 (2.1)
Skin infection	4 (2.1)
Earache	2 (1.1)
Irritability	2 (1.1)
Limb pain	2 (1.1)
Weight loss	1 (0.5)
Sore mouth	1 (0.5)

Table IV. Serious reactions adverse events following immunisation reported after pentavalent diphtheria-tetanus-pertussis-hepatitis B vaccine/*Haemophilus influenzae* type B vaccine administration, and their causal relationship to vaccine administration

Case description	Diagnosis by attending physician, action taken and sequelae	Causality assessment
7-month old baby with fever, vomiting and diarrhoea 4 months after last dose of vaccine	Malaria and gastroenteritis diagnosed. Patient detained overnight and administered amodiaquine syrup, paracetamol (acetaminophen) syrup, normal saline infusion and half-strength Darrow's solution. The patient was discharged the following day	Unlikely
19-week old baby with fever, difficulty in breathing and cough a day after administration of first dose of vaccine	Bronchopneumonia and chloroquine-resistant malaria diagnosed. Patient admitted and administered IV crystalline penicillin, chloramphenicol and dextrose saline as well as amodiaquine suspension and amoxicillin syrup. Recovered fully and was discharged after 2 days	Unlikely
8-month old baby with vomiting, diarrhoea, fever and cough, 4 months after the administration of third dose of vaccine	Gastroenteritis and malaria diagnosed, with the suspicion of bronchopneumonia. Amodiaquine and paracetamol syrups administered and patient discharged the following day. Reported 3 days later with cough, fever and abscess in left ear. Prescribed flucloxacillin syrup and discharged. Patient was not admitted on second visit	Unlikely

such as time constraints, the absence of any adverse events or the deferment of answering to the next immunisation visit. This is the reason why only 921 parent interviews occurred, instead of the 1104 that might be expected if all parents provided information about AEFI at every occasion specified in the protocol. However, all of the parents/guardians provided answers during at least two of the expected three follow-up interviews. The most common events reported were fever, common cold (nasal discharge, rhinitis, catarrh, cold), crying and cough, giving crude, incidence rates for these reactions among the study cohort of 14.7%, 3.8%, 3% and 2.8%, respectively.

Discussion

This purely descriptive study was designed to obtain reliable baseline information on the AEFI associated with the administration of the DTP-hepatitis B vaccine/Hib vaccine in Ghana. A significant limitation of this study is that including 406 participants allowed only common, frequent adverse events to be detected. Large numbers of patients would be needed to detect rare, serious adverse events and the current study was neither powered nor structured to detect these. This study therefore only provided an indication of the frequency and nature of common adverse events associated with this vaccine. A well promoted, nationwide AEFI spontaneous reporting system should, in time, permit detection of rare adverse events.

The results from this study are comparable with those from studies of similar duration and design reported in the literature and with those obtained using vaccines containing similar antigens. For example, Aristegui et al.[7,8] detected incidences of fever of up to 21% in patients given a pentavalent vaccine in Spain, although children in that study received the vaccine at 2, 4 and 6 months of age – roughly 2 weeks later at each stage than the schedule in Ghana. The lower incidence of febrile episodes in this study may be due to the administration of paracetamol syrup to all infants after immunisation. A recent publication by Tregnaghi and coworkers[9] showed an excellent safety profile for an identical combination pentavalent vaccine for both primary and booster immunisations. A study[12] in the US involving 400 children found no vaccine-related adverse events in any of the randomised groups after administration of three doses of a pentavalent vaccine containing diphtheria, tetanus, acellular pertussis, *Haemophilus influenzae* and intradermal polio antigens. In another study in Sweden, a combined diphtheria-tetanus-acellular-pertussis-inactivated polio vaccine-Hib vaccine administered to children between 2 and 13 months after birth led to no serious adverse reactions, with minimal rates of febrile events and local reactions[13] Finally, a 5-arm controlled study involving a pentavalent vaccine

Table V. Adverse events following immunisation with the pentavalent diphtheria-tetanus-pertussis-hepatitis B vaccine/*Haemophilus influenzae* type B vaccine that were reported in response to specific questioning during follow-up

Event	No. of parent interviews at which individual events were reported	Crude incidence rate (% total visits)[a]
No adverse event	665	72.2
Fever	135	14.7
Common cold	35	3.8
Crying	28	3.0
Cough	26	2.8
Swelling	13	1.4
Others	22	2.4
Total	921[b]	100.3

a Calculated as the number of parent interviews at which a specific adverse event was reported divided by the total number of interviews, multiplied by 100/1 to give a percentage.

b The total number of interviews at which any adverse event was reported is less than the sum of the individual event rates as more than one event was reported at some interviews.

with similar antigens to those used in this study found no differences in safety and immunogenicity when DTP, Hib and hepatitis B were administered sequentially or in combination.[14] The addition of hepatitis B and Hib components to the DTP did not lead to an increased rate of adverse events.

The AEFI reported to the dedicated hospital unit were mainly cough, fever, cold/nasal discharge, diarrhoea and vomiting (table III). These conditions are highly prevalent amongst children of this age group in Ghana,[15] and there appeared to be no association between administration of the pentavalent vaccine and the occurrence of these events. Three reported events were classified as 'serious' since they required hospitalisation. Formal causality assessment of each of these events show that they were unlikely to have been caused by the study vaccine.

Thirty-eight patients defaulted or were lost to follow-up during this study. Defaulters were classified as those participants who did not return for their immunisations as expected and did not attend an immunisation clinic within the 28 days thereafter. Attempts were made to contact the 38 defaulting patients. Ten were contacted through home visits and/or phone calls. Of these, one father objected to his child being enrolled in the study despite the mother having given approval, a finding which underscores the important role of fathers in immunisation programmes and which highlights the need to pay special attention to fathers, especially in environments where patriarchal influences are strong. Five parents had moved out of Accra and hence their children could no longer participate in the study. Four participants had moved out of the immediate study area and thus preferred to continue immunisation at closer locations. In addition to these ten participants, two who could not be traced on an earlier occasion returned to complete their immunisation after they had been asked for their immunisation records when they went to obtain birth certificates for their children. Linking immunisation records to birth registration and possibly enrolment at school appears to be a strategy likely to increase uptake of routine immunisation services. Twenty-six participants (6.4% of those enrolled) were completely lost to follow-up.

There were several challenges in the process of carrying out this study. The original study design was changed from a comparative one to a descriptive one because of the absence of data on AEFI associated with DTP. Patient recruitment was originally intended to be carried out at the Korle-Bu Teaching hospital. However, several of the patients at Korle-Bu were excluded on medical grounds since they attended the tertiary facility mainly because of pre-existing medical conditions. Furthermore, parents who had given birth in Korle-Bu did not necessarily want to return to the hospital for immunisation, preferring to do this closer home. Patient recruitment was therefore enhanced when recruitment was expanded to include the nearby Mamprobi and Ussher Town polyclinics, as well as the Zongo Junction Community Immunisation Centre. These study locations are predominantly urban, but their immunisation practices are not dissimilar from those in rural locations and the results can be generalised nationwide. This study has shown that it is possible to carry out well designed, prospective

safety studies in resource-limited environments despite the, not unexpected, difficulties and challenges. An understanding of the constraints and a willingness to adapt without sacrificing scientific rigor holds the key to successful implementation of such studies.

A curious observation in this study was the role of national immunisation days (NIDs) on routine immunisation. Attendance at immunisation clinics fell sharply after NIDs. Parents appeared unsure of what to do about their immunisation should an NID cause the cancellation of a scheduled immunisation appointment: they did not know whether to return the following week to continue the immunisation or to wait for 4 weeks for their next scheduled appointment. A similar observation on the role of NIDs on routine immunisation in Ghana has been made.[16] The development of clear messages to parents on the conduct of routine immunisation following NIDs is therefore an issue that requires attention by EPI managers in Ghana and other developing countries.

This study has provided evidence of the safety of the pentavalent (DTP-hepatitis B/Hib) vaccine in Ghana, a finding that conforms with the safety of combination vaccines with similar contents used elsewhere. It has also yielded useful background data on vaccine safety in Ghana and will go a long way to strengthen the national EPI programme. As part of this study, a National Advisory Committee on Vaccine Safety was established under the auspices of the Ghana Health Service. This 16-member committee, composed of experts in paediatrics, internal medicine, statistics, immunology, pharmacovigilance, drug regulation, statistics, pathology, community health, clinical pharmacology, bacteriology and virology, met twice to assess the causality of serious AEFI cases reported by the study and to provide guidance on immunisation in Ghana. The committee has been assured of funding by the Ghana Health Service for its continued activities and will provide support to the national EPI in all issues that may have potential safety implications and impact upon immunisation in Ghana.

Conclusion

The pentavalent vaccine DTP-vaccine/Hib vaccine is safe and well tolerated in Ghanaian children. The incidence of advents is low, with crude incidence rates being 14.7% for fever, 3.8% for common cold, 3% for crying and 2.8% for cough. No vaccine-associated serious adverse event was recorded in the study cohort and only one case of injection site abscess was reported. Since the number of participants was small, only common minor events could be recorded. A study involving a larger cohort of patients is required in order to identify rare, uncommon adverse events following immunisation. In addition, continuous safety surveillance involving spontaneous reporting would, with time, permit identification of any rare, serious adverse events.

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