

**THE BENEFITS OF BOOSTER TETANUS DIPHTHERIA (Td)
IMMUNIZATION ON ADOLESCENT TO PREVENT
REEMERGING DISEASE IN INDONESIA**

*A review of immune response and safety perspective based on reduced dose
diphtheria vaccine*

ABSTRACT

In the 1990s, a massive epidemic throughout the Newly Independent States of the former Soviet Union marked the reemergence of epidemic diphtheria in industrialized countries. In Indonesia, the same thing could potentially happen in the absence of continuous booster immunization program in adolescent. The aim of this study was to evaluate the immunogenicity and safety of a vaccine formulated with tetanus toxoid, diphtheria toxoid antigens (Td) compared with tetanus toxoid vaccine (TT) for booster immunization in adolescents. This prospective, randomized double-blind controlled clinical trial study on healthy adolescent aged 10 to 18 years. Two hundred and ninety six healthy adolescents were randomly divided into two groups by simple randomized sampling. Group I received a single 0.5 mL dose of Td vaccine, administered by intramuscular injection in the deltoid muscle. Group II received TT vaccine as a control. The safety data was collected up to one month after injection by diary card to record the appearance, the duration and the intensity of any local reaction and any systemic event. Blood samples were obtained before and 1 month after vaccination. Standardized enzyme-linked immunosorbent assays (ELISAs) were used to assess antibody concentrations to diphtheria and tetanus toxoids. Differences between proportions were determined by the Chi-square or Fisher's exact test. Seroprotective antibody concentrations (≥ 0.1 IU/mL) against diphtheria and tetanus were achieved by 93.2% and 100.0%. The geometric mean titer (GMT) was significantly increased from 0.0618 IU/mL to 0.7583 IU/mL ($p < 0.001$); while against tetanus the GMT was significantly increased from 0.4413 IU/mL to 14.4054 IU/mL ($p < 0.001$). Pain at the injection site were seen 20.3% in Td and 18.2% in TT ($p = 0.028$). Fever $> 37.5^{\circ}\text{C}$ occurred infrequently in both Td and TT recipients (Td range: 0.7-4.7%; TT range: 3.4-6.7%). No serious adverse events occurred and all vaccinations were well tolerated. In conclusion: booster Td vaccine is highly immunogenic and safe in adolescent.

Key words: *Adolescents, booster dose, protectivity, safety, Td vaccine*