Cost-Benefit Analysis of the Newborn Screening Program of the Philippines

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Abstract

Background. Newborn Screening (NBS) is a public health activity aimed at the early identification of infants who are affected by certain genetic/metabolic/infectious conditions. A cost analysis is critical implementation for integration as a public health program

Objectives. 1) To determine the incidence rates if congenital hypothyroidism (CH), congenital adrenal hyperplasia (CAH), galactosemia (GAL), phenylketonuria (PKU) and glucose-6-phosphate dehydrogenase (G6PD) deficiency; and 2) To determine whether NBS is cost-beneficial foe each disorder individually or combination, from societal perspective.

Study Design. Cross sectional survey and cost-benefit analysis.

Subjects and Methods. The study was conducted through a screening survey of the original 24 Metro Manila hospitals. Newborns were screened for CH, CAH, GAL, PKU and G6PD deficiency after the 24th hour of life. Those who screened positive underwent serum confirmatory testing. Using incidence rates from the screening survey, a population of 1.5 million, and different screening combinations, the costs for the detection and treatment of the five disorders were compared to the benefits projected from preventing the corresponding complications and consequent productivity losses. For economic evaluation, we compared sequential analysis of doing tandem/multiple testing for different disorders vs a “do-nothing” alternative. Sensitivity analyses for different incidence and discount rates were conducted to test the strength of the conclusions.

Results. The incidences of disorders with 95% confidence intervals are: CH is 1:3 235 (1:2 219 – 1:5 946); CAH is 1:7 455 (1:4 046 – 1:14245); GAL is 1:106 006 (1:44 218 -1:266 796); and G6PD deficiency is 1:167 (1:151-1:186).Screened individually, CH and G6PD deficiency had net benefits of US$ 5.29 M and US$ 15.44 M, respectively. The other conditions yielded net costs when screened individually - CAH (US$ 2.61 M), GAL (US$ 0.90 M) and PKU (US$ 6.74 M). Pairing the disorders with CH showed the following benefits: cost ratios – CH + CAH, 1, 3; CH + GAL, 2.0; CH + G6PD deficiency, 3.4; and CH + PKU, 0.9.

Combining disorders resulted in the following benefit: cost ratios - CH + CAH + GAL, 1.2; CH + CAH + GAL + PKU, 0.8; and CH + CAH + GAL + G6PD deficiency, 2.1. Screening for the 5 disorders in tandem resulted in a benefit: cost of 1.4 and a net benefit of US$ 11.42 M.

Conclusion: This study demonstrates that the benefits of an NBS program in the Philippines far outweigh the social societal costs of a “do-nothing” alternative. The benefit: cost ratio for the 5-disorder program is 1.4 and the net benefit for the 5-disorders screening program is US$ 11.42 M.