PHOTOTHERAPY DEVICE EFFECTIVENESS IN NIGERIA: CURRENT IRRADIANCE LEVELS AND SIMPLE STRATEGIES FOR IMPROVEMENT

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INTRODUCTION
Neonatal hyperbilirubinemia is a major cause of neonatal morbidity and mortality in resource limited settings. Recent surveys, including a 2011 survey of phototherapy devices in Nigerian hospitals (Owa et al, Indian Journal of Pediatrics 2011), have shown that phototherapy (PT) devices for neonatal hyperbilirubinemia in these settings frequently deliver suboptimal treatment. There is a need for identification of means for improving effectiveness of treatment delivered by existing devices, in order to reduce the incidence of kernicterus and the need for blood exchange transfusions.

OBJECTIVE
To survey the efficacy of PT devices in resource-diverse Nigerian hospitals and identify strategies to improve performance.

METHODS
• PT devices were evaluated in hospitals selected by convenience sampling across 4 Nigerian states and the Federal Capital Territory. The sampled 16 urban and semi-urban hospitals included both public and private facilities.
• Spectral irradiance was measured for each device as found, using a GE Healthcare BillBlanket Light Meter I or II, or Minolta Fluoro-Lite 451 meter.
• For a subset of devices where consent was obtained, adjustments were made and the optimized irradiance levels were subsequently recorded. Irradiance data are reported as mean level ± SD μW/cm²/nm.
• Statistical comparisons were made using Student’s t-test.

RESULTS

Table 1. Adjustments found to improve irradiance levels.

CONCLUSIONS
Poor irradiance levels are frequently delivered by PT devices at the 16 hospitals surveyed in Nigeria. With simple, low cost adjustments, the efficacy of PT devices can often be improved substantially. More efficacious PT should decrease both the incidence of kernicterus and the need for exchange blood transfusions. There is a need for educational outreach to ensure that effective treatment is provided from existing PT devices.

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