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Disclosures

- Neither author has relevant COI or disclosures related to this study.
Background

- The burden of expensive pedicle screws may restrict access to surgical care.

- This study investigated how implant costs impact access to pediatric spinal deformity surgery (PSDS) globally.
Methods

• A 28-item survey was developed on RedCap
• SRS members or published international spine surgeons were queried regarding the following
  – costs of pedicle screws
  – patient characteristics
  – cost reduction strategies
  – barriers to PSDS in their countries
Methods

• Two cohorts were created
  – World Bank classification of “high income country” (HIC) (gross national income per capita (GNIPC) >$12,616) vs “low income country” (LIC)

• Statistical analysis utilized
  – T-tests for continuous variables
  – Chi-square for categorical data (alpha level <0.05)
  – Multivariate regression analysis to correlate implant costs as a function of GNIPC
Methods

• Implant costs were stratified between local & international manufactures.

• Local Manufacturers
  – Physician owned or start-up entities that only market implants locally or regionally
Results

• Surveys were electronically sent to 441 pediatric spine surgeons in 58 countries

• 95 surgeons (21.5%) from 36 countries responded, with 70 (73.7%) surgeons from HICs & 25 (26.3%) from LICs
  – 34 US Surgeons
Results

Surgeons from LICs performed a greater annual number of pediatric deformity cases than the HIC cohort (83 vs 56, p=0.05)
Results

Locally Manufactured Monoaxial Screws

Local Manufactured Polyaxial/Uniaxial Screws

International Manufactured Monoaxial Screws

International Manufactured Polyaxial/Uniaxial Screws

- GNI per Capita < $12,616
- GNI per Capita > $12,616*
Results

Quality of Locally Manufactured Pedicle Screws vs. International Screws

- **GNI per Capita < $12,616**
  - Less than International Screws: p=0.44
  - Similar to International Screws: p=0.2
  - Better than International Screws: p=0.005
  - Do not Use Local Screws: p=0.04

- **GNI per Capita > $12,616**

Results

To reduce costs, a greater proportion of the LIC cohort utilized locally manufactured, older, refurbished, or donated implants \((p<0.05)\)

HIC cohort favored volume based or price negotiations with the vendor \((p<0.05)\)
Results

Strategies for Affordable Spine Surgery

- Utilize wires, hooks, or less expensive implants (p=0.47)
- Fewer number of implants per surgery (p=0.52)
- Use government healthcare (p<0.001)
- Corporation Sponsorship (p=0.005)
- Obtain charitable donations (p=0.45)
- Utilize locally made implants (p<0.001)
- None of the above (p=0.06)

GNI per Capita < $12,616
GNI per Capita > $12,616*
Results

Barriers for Spinal Deformity Care for Children

- **GNI per Capita < $12,616**
- **GNI per Capita > $12,616**

<table>
<thead>
<tr>
<th>Barrier</th>
<th>GNI per Capita &lt; $12,616</th>
<th>GNI per Capita &gt; $12,616</th>
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<tbody>
<tr>
<td>Access to your practice (p=0.97)</td>
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<td>Hospital admission is unaffordable (p=0.29)</td>
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<tr>
<td>Implant costs are too expensive (p&lt;0.001)</td>
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<td>Too much trauma and no time for elective cases (p=0.11)</td>
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<td>Lack of expertise (p=0.28)</td>
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<td>Unsafe surgical facilities (p=0.005)</td>
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<td>Lack of Intensive care unit (p=0.55)</td>
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<td>Lack of blood bank</td>
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<td>None of the above (p&lt;0.001)</td>
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</table>
• Surgeons from LIC’s perform a greater number of procedures annually

• Implant costs were greater in HIC’s

• Patients in LICs are more likely to pre-pay or pre-purchase implants from the surgeon or vendor
Discussion

• The majority of surgeons who utilize both local and international manufactured screws rated them as being similar in quality.

• To reduce costs, a greater proportion of the LIC cohort utilized locally manufactured, older, refurbished, or donated implants.
  • HIC cohort favored volume based or price negotiations with the vendor.

• Implant costs and unsafe surgical facilities, rather than surgeon experience or skill, were more important barriers to access to PSDS in low-income countries.