SAFFA: The South African Food sensitisation and Food Allergy study

• Botha M, Basera W, Gray C, Facey-Thomas H, Levin ME.

• The Prevalence of IgE mediated Food sensitisation and Food Allergy in unselected 12-36 month old urban South African Children. (abstract). CACI 2014; 27 (3): 230
SAFFA study

Prevalence study (cross sectional)

– IgE mediated Food sensitisation + Food Allergy
– Unselected 12-36 month old children in Cape Town (recruited from crèches)
– Using questionnaire, SPT for screening
– OFC to confirm diagnosis in all children with SPT >1mm + NOT tolerant to age appropriate portion of that food
– Peanut, egg, cow’s milk, soya, wheat, fish, hazelnut
– Non-participants
- 86.3% Not Allergic
- 13.4% Sensitised but not allergic
- 1.8% Food Allergic

Non-participants:
- 28

Participants:
- 284
  - SPT -ve: 245
  - SPT ≥1mm: 39
    - Tolerant: 26
    - Not tolerant: 13
      - OFC -ve: 8
      - OFC +ve: 5

Race:
- Black African: 46%
- Mixed Race/Coloured: 42.4%
- White: 11.6%
## Spectrum of sensitisation and Food Allergy

<table>
<thead>
<tr>
<th></th>
<th>Overall n</th>
<th>Egg</th>
<th>Peanut</th>
<th>Cow’s Milk</th>
<th>Hazelnut</th>
<th>Soya</th>
<th>Wheat</th>
<th>Fish</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>95% CI</td>
<td></td>
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</tr>
<tr>
<td>SPT ≥1mm</td>
<td>13.7%</td>
<td>9.5%</td>
<td>5.3%</td>
<td>3.5%</td>
<td>1.8%</td>
<td>1.8%</td>
<td>1.4%</td>
<td>1.1%</td>
</tr>
<tr>
<td></td>
<td>39 (9.7-17.8)</td>
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</tr>
<tr>
<td>SPT ≥3mm</td>
<td>9.9%</td>
<td>7.8%</td>
<td>3.2%</td>
<td>1.8%</td>
<td>0.7%</td>
<td>0.7%</td>
<td>0</td>
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<tr>
<td></td>
<td>28 (6.4-13.3)</td>
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<tr>
<td>SPT ≥7mm</td>
<td>4.2%</td>
<td>3.9%</td>
<td>1.1%</td>
<td>0.4%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td></td>
<td>12 (1.9-6.6)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>OFC positive</td>
<td>1.8%</td>
<td>1.4%</td>
<td>1.1%</td>
<td></td>
<td>0.4%</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>5 (0.6-4.1)</td>
<td></td>
<td></td>
<td></td>
<td>0.4 (0.4-3.6)</td>
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<td></td>
<td></td>
<td>1.1 (0.2-3.1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPT Any Food</td>
<td>Black African (n=131)</td>
<td>Mixed Race (n=118)</td>
<td>Caucasian (n=33)</td>
<td>p-values</td>
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</tr>
<tr>
<td>≥1mm</td>
<td>9.9%</td>
<td>13.6%</td>
<td>12.1%</td>
<td>0.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥3mm</td>
<td>9.2%</td>
<td>10.2%</td>
<td>12.1%</td>
<td>0.8</td>
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</tr>
<tr>
<td>≥7mm</td>
<td>2.3%</td>
<td>5.9%</td>
<td>6.0%</td>
<td>0.3</td>
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</table>
SAFFA study

• 1\textsuperscript{st} food challenge proven FA prevalence in unselected children in Africa.

• A basis for further monitoring of a population possibly only at the beginning of the food allergy epidemic.

• High sensitisation rates in Black African and Mixed race children are similar to the high rates of aeroallergen sensitisation seen in unselected and allergic populations.

• Further expansion
  – Describe prevalence of socio-demographic, environmental and family related risk factors in study population
  – Compare prevalence of sensitisation and food allergy between urban Caucasian, Mixed race and black African children
  – between rural and urban Black African Xhosa children
  – Generate population-specific cut-off levels for SPT and Immunocaps with 95\% positive predictive values.
Description and outcomes of oral food challenges in a Tertiary Paediatric Allergy clinic in South Africa.

Talita Ferreira-van der Watt, Wisdom Basera, Michael Levin

Ferreira-Van Der Watt TA, Basera W, Gray C, Levin ME. Description and outcomes of 202 oral food challenges in a tertiary paediatric allergy clinic in South Africa. CACI 2014; 27 (3): 231
Results

- February 2011 to April 2014
- 202 OFC
- 142 children
- 9 months to 14 years
- 18 different foods

- 18.8% (n=38) OFC were positive
- Urticaria: 60.5% (n=23)
- Angioedema 28.9% (n=11)
- Wheeze 7.9% (n=3)

**Challenge foods**

<table>
<thead>
<tr>
<th>Challenge foods</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egg</td>
<td>11.6%</td>
<td>14.5%</td>
<td>21.5%</td>
<td>36.0%</td>
</tr>
<tr>
<td>Peanut</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baked egg</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cow's milk</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**Positive OFC**

- 2011: 11.6%
- 2012: 14.5%
- 2013: 21.5%
- 2014: 36.0%
• Younger children = higher incidence of positive OFC
  – 33.3% in children below 2 years (n=14/42)
  – 9.2% (n=24/260) in children above 2 years (p=0.01)

<table>
<thead>
<tr>
<th></th>
<th>Egg (%)</th>
<th>Peanut (%)</th>
<th>Baked egg (%)</th>
<th>Cow’s milk (%)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive OFC</td>
<td>14% (n=9/64)</td>
<td>35.1% (n=13/37)</td>
<td>17.2% (n=5/29)</td>
<td>20% (n=5/25)</td>
<td></td>
</tr>
<tr>
<td>Median age at challenge</td>
<td>53 months</td>
<td>67 months</td>
<td>38 months</td>
<td>29 months</td>
<td>p=0.01 (all 4 groups)</td>
</tr>
</tbody>
</table>

• Co-morbidities
  – atopic dermatitis 73.9% (n=105/202)
  – asthma 37.3% (n=53/202)
  – allergic rhinitis 45.8% (n=65/202)
  – allergy to multiple foods 62.7% (n=89/202)

• Co-morbidity prevalence was significantly different between groups with positive and negative OFC outcomes (p<0.01).
Conclusion

• OFC
  – Necessary to accurately diagnose children with food allergies
  – Assess development of tolerance
  – Majority of food challenges are negative
  – Positive OFC usually have mild reactions
  – Increased utilisation of OFC’s → increased numbers of true food allergy diagnoses

• Prevalence of positive challenges and age at the time varies between different foods.

• Younger children had an increased risk of positive OFC outcome.

• Peanut allergy was the most common food allergy diagnosed.

• Those children with positive food challenges had a significantly higher degree of allergic co-morbidity.
Oral food challenges in children at a tertiary allergy clinic in Africa: Significance of specific IgE levels differs from international standards and varies with ethnicity.

Talita Ferreira-van der Watt, Wisdom Basera, Michael Levin

Background

- Sampson\(^1\) determined 95% PPV of specific IgE for food challenge outcome in children in a first world country.

- Predictive values for African children have not been determined.

<table>
<thead>
<tr>
<th>Food</th>
<th>IgE (kU/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egg &gt; 2 years old</td>
<td>7</td>
</tr>
<tr>
<td>Egg &lt; 2 years old</td>
<td>2</td>
</tr>
<tr>
<td>Cow’s milk &gt; 2 years old</td>
<td>15</td>
</tr>
<tr>
<td>Cow’s milk &lt; 2 years old</td>
<td>5</td>
</tr>
<tr>
<td>Peanut</td>
<td>14</td>
</tr>
</tbody>
</table>

Methods

- Retrospective, descriptive study
- Children 0 to 14 years
- Red Cross Children’s Hospital’s tertiary Allergy clinic
- Open OFC
- 39 month period from February 2011 to April 2014
Results

- 202 OFC
- 142 children
- 9 months to 14 years of age

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Number of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixed race</td>
<td>170 (84.1%)</td>
</tr>
<tr>
<td>Black African</td>
<td>26 (12.9%)</td>
</tr>
<tr>
<td>White</td>
<td>2 (3%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Mixed race</th>
<th>Black African</th>
<th>White</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median age at challenge</td>
<td>47 months</td>
<td>42 months</td>
<td>117 months</td>
<td>0.007 Kruskal Wallis</td>
</tr>
<tr>
<td>Positive OFC outcome</td>
<td>18.8% (32/170)</td>
<td>15.4% (4/26)</td>
<td>33.3% (2/6)</td>
<td>0.5 Fisher exact</td>
</tr>
</tbody>
</table>
Negative challenge with IgE above 95% PPV

<table>
<thead>
<tr>
<th>Challenge food</th>
<th>Mixed Race</th>
<th>Black African</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egg</td>
<td>36.1% (17/47)</td>
<td>42.9% (3/7)</td>
</tr>
<tr>
<td>Cow’s milk</td>
<td>40.0% (6/15)</td>
<td>80.0% (4/5)</td>
</tr>
<tr>
<td>Peanut</td>
<td>21.7% (5/23)</td>
<td>0% (0/1)</td>
</tr>
</tbody>
</table>
Conclusion

• Large numbers of patients have negative challenges despite IgE levels above the internationally derived 95% PPVs.

• A higher proportion of Black African children have
  – negative egg and milk challenges despite IgE levels above the internationally derived 95% PPVs

• Possible unknown mechanism of immune tolerance present in Black African children leading to higher levels of sensitization without clinically significant allergy.
Food allergy in children with eczema

Claudia Gray, George Du Toit, Mike Levin


Food allergy in children with eczema

- 100 children
- 6 months to 10 years
- Moderate to severe AD
- Randomly selected from a dermatology clinic at the Red Cross Children’s Hospital in Cape Town
- Food allergy screening
  - Questionnaire
  - skin prick tests
  - allergen specific IgE ISAC 103
Age of onset and FA prevalence

- <6 mths: 66%
- 6-12 mths: 28%
- >12 mths: 17%
Sensitisation vs allergy

- Egg: 54% sensitized, 25% allergic
- Peanut: 43% sensitized, 24% allergic
- Cow's milk: 27% sensitized, 2% allergic
- Fish: 13% sensitized, 1% allergic
Ethnicity effects sensitisation vs allergy

![Bar chart showing sensitzation vs allergy by ethnicity](chart.png)
Ethnicity effects sensitisation vs allergy

- Egg - Mixed Race: Sensitized 46%, Allergic 27%
- Egg - Xhosa: Sensitized 59%, Allergic 24%
- Peanut - Mixed Race: Sensitized 50%, Allergic 38%
- Peanut - Xhosa: Sensitized 37%, Allergic 15%

Ethnicity affects sensitisation vs allergy.
95% positive predictive values differ in their utility according to ethnicity

<table>
<thead>
<tr>
<th>PPV</th>
<th>Mixed race</th>
<th>Black African</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPT&gt;8</td>
<td>88</td>
<td>80</td>
</tr>
<tr>
<td>IgE&gt;14</td>
<td>90</td>
<td>57</td>
</tr>
<tr>
<td>Arah2 &gt;0.35</td>
<td>93</td>
<td>53</td>
</tr>
</tbody>
</table>
Component tests

- Component tests had a similar pattern in both.
- Arah2 performs best in both.
- Component tests differ in their utility according to ethnicity: ROC curves.
ROC curve for ImmunoCAP rArah2 in peanut allergy diagnosis

- Mixed race patients ROC area: 0.91
- Xhosa patients ROC area: 0.85

p = 0.6
ROC curve for ImmunoCAP Peanut in peanut allergy diagnosis

- Mixed race ROC area: 0.87
- Xhosa ROC area: 0.76
- p=0.4
Food allergy in children with eczema

• Difference in household income
• No difference in peanut consumption patterns
• Difference in environment?
• Higher timothy grass sensitisation in mixed race
• Total IgE higher in mixed race
EoE in Cape Town, South Africa

Michael Levin, Cassim Motala

Eosinophilic oesophagitis in Cape Town, South Africa. (abstract) Clinical and Translational Allergy 2011; 1(Suppl 1):26
EoE in Cape Town, South Africa

- 8 children described between 2009 and 2010
- 3 boys, 5 girls
- Average age: 7 years (1yr 11 months to 15 years 10 months)
- Ethnicity: 2 caucasian, 5 mixed, 1 Black African
- Age of onset: median 1 year 4 months
- Age of diagnosis: median 3 years 9 months
EoE in Cape Town, South Africa
EoE in Cape Town, South Africa

- Immediate food allergy: High incidence
- Eczema: High incidence
- Rhinitis: High incidence
- Asthma: Moderate incidence
- Urticaria: Low incidence
EoE in Cape Town, South Africa

- 26 biopsy specimens, mean 3.25 per patient
- Only 4/8 confirmed peak eosinophil count >15/hpf, 7/8 had minor features present.

- Food skin prick tests 152 (19 per patient).
- Positive skin tests >=1mm 57 (13 per patient).

- Skin tests >=3mm 32 (7 per patient).

- Patch tests 167 (21 per patient). 30 positive, average of 4.3 per patient.
EoE in Cape Town, South Africa

• All were commenced on short course of oral steroids. All were commenced on a targeted elimination diet, excluding any food with positive skin or patch test. All had clinical improvement. 3 remain controlled with acceptable symptoms, 2 improved but have ongoing symptoms and significant difficulties, 2 very symptomatic with poor control, 1 defaulted.
ALLSA

- ALLSA is the national Allergy Society of South Africa representing all related allied health professionals.
- The purpose of ALLSA is to advance the knowledge and practice of allergy and immunology through publications, meetings, and conferences and to foster the education of both students and the public.
ALLSA

- Journal
- Handbook of allergy
- Patient advice pamphlets
- Talks
- Allergy diploma, EAACI exam, certificate
- Annual meetings
ALLSA

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