

COST-EFFECTIVENESS OF G6PD SCREENING IN LEBANESE NEWBORN MALES

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Introduction

- G6PD deficiency is a common genetic defect in Lebanon (estimates between 1-2% among males)
- Diagnosis often ignored until first hemolytical accident
- Particular risk for accidents linked to local habits of consuming raw fava beans which precipitates «favic» accidents

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Introduction

- There are no public programs for newborn screening. About 60% of newborn babies never receive any screening at birth
- A G6PD-deficiency screening program for newborns was started in our center in 1996

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Introduction

- 1996-2005: 610 cases /110,000 newborn babies screened

Cumulative Incidence Rate: 5 ‰

- 10 ‰ among males (n=584) vs 0.5 ‰ among females (n=26)

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Introduction

- 2002: Gene analysis

Of 36 cases, 83 % had the Med variant and 11% had the A- variants more common to African patients. There were no differences in severity corresponding to one specific genotype

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Introduction

- Research agenda was developed to evaluate this G6PD screening cost-effectiveness
- This was based on the analysis of risk for critical anemia crises in unscreened individuals

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METHODS

- Community-based cluster sampling survey was conducted in 15 villages, 3 in each administrative district « mohafazat »
- Population targeted: males aged above 14 years
- Dried blood samples (DBS) were collected + questionnaire



(Khneisser et al. J Med Screen 2006)

Methods

LABORATORY PROCEDURES FOR G6PD SCREENING

- Modified Beutler semi-quantitative analysis for DBS
- Fluorescence spot on UV lamp
- Whatman N°1 filter paper
- With and without Ammonium Sulfate

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Results

- 36 cases of G6PD deficiency detected in 3000 previously unscreened males :
Prevalence rate of 12‰

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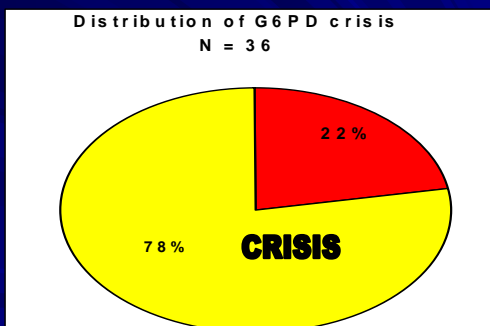
Results

- Of 36 cases detected, 28 reported at least one anemic crisis
- Under-estimation:
 1. Recall bias: less severe crises may have been undetected and/or forgotten
 2. Deaths resulting from more severe cases were not included in the count

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Results



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Results

- Mean age at first crisis had been 4.2 years (median 4 years)

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Results

The occurrence of hemolytic accidents among G6PD-deficient male cases previously diagnosed between 1999-2004, of whom 46.5% (139/299 cases) were located and interviewed

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Results

- Only 5 cases had ever suffered any crisis (3.8%)
- Ages ranged from 9 months to 6 years
- Mean cost of hospitalization per hemolytic accident was 1450 USD.

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Discussion

- Is the overall direct cost for cases of hospitalization saved through detection substantially superior to that of a universal detection program?
- Consequently does it make economic sense to screen all newborns for G6PD deficiency?

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Discussion

- With screening, 740 hospitalizations will be avoided for every 1,000 detected cases of G6PD deficiency
- The detection of those 1,000 cases requires testing 100,000 babies
- At the rate of 3 USD the total cost of screening 100,000 babies is therefore 300,000 USD

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Discussion

- It costs the community $300,000 / 740 = 405.4$ USD to avoid one hospitalization for each G6PD deficient baby
- This compares favorably with the mean cost of each hospitalization : 1450 USD
- Cost saved / cost spent = $(1450 - 405.4) / 405.4 = 2.58$

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Discussion

- A simple equation clearly indicates that costs of testing are largely offset by costs of hospitalizations avoided among screened boys
- Need to do the same analysis for girls (10 times lower prevalence)?

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Discussion

The indirect costs saved, not factored into this analysis, are also very important:

- Lost income of patients and/or main care-takers
- Logistical strains on families
- Physical and emotional sufferings of patients and families

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Discussion

- The cost saved may increase as screening increases and overhead expenses are more largely distributed
- At the other end of the process, the savings will also increase as costs of in-hospital care and investigations continue to increase as they have for the last decade

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Conclusions

- High incidence of G6PD deficiency and culturally-specific food habits potentially leading to crisis indicate that screening is essential
- Economically : adopting a general policy for newborn screening will result in direct cost savings mostly from avoided hospitalizations
- The program can also be justified by the reduction of the social and indirect impact that a crisis in non-detected deficiency for individuals and their families

THANK YOU