



Tehran University of Medical Sciences
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Evaluation and Cost–Effectiveness Analysis of prevention program of Major Thalassemia in West – Azerbaijan province, Iran at 2007.

Presenter:

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Introduction:

Thalassemia is one of the diseases which despite its costly, difficult and of course, uncertain treatment, it is easily preventable. Considering the spread of its gene in Iran since 1995, the control and prevention program as the first, non-contagious disease is being carried out through out the country. In Iran almost 1800 people adds to this population annually. The prevalence of the disease is estimated at 4-8%.

Aim: Regarding to importance of disease, we have attempted to calculate the cost- effectiveness ratio through a decision analysis approach based upon the best evidence.



Methods:

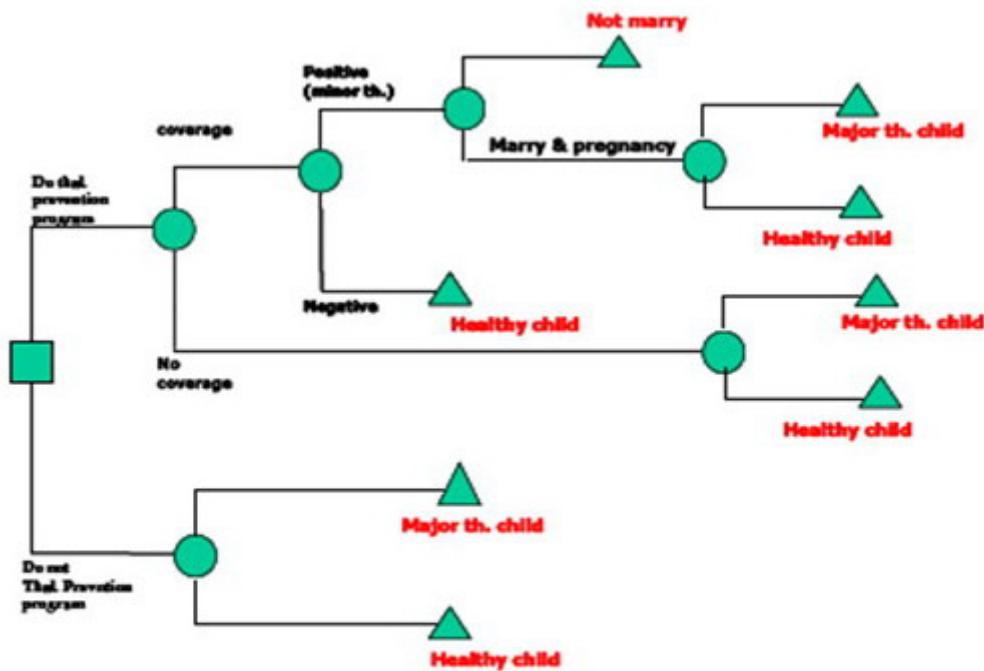
In this study we evaluated the cost-effectiveness of Thalassemia prevention program.

. The evaluated measures were:

1. Thalassemia major incidence per year (infants born with thalassemia major in a year/ all the newborns in that year)
2. The program's coverage (number of the couples entering the study/ all the couples registered)
3. Efficacy of consultation (rate of dissuasion after consultation = the number of carrier couples who called off their wedding after consultation/ all the carrier couples who had a consultation)

Terminal cost-effectiveness index [(cost imposed without plan-cost imposed with plan)/(number of infants born with major thalassemia without plan-number of infants born with major thalassemia with plan)].

. Figure 1 shows a simple form of decision tree for major-Thalassemia prevention program. Effectiveness of the plan has been evaluated considering a 15 year treatment cost (6500 US \$ and each \$ is 9300 IR-Rls).



Ministry of Health, Deputy of Treatment affairs, Center for disease Management.

Note: Square represent Decision, Circle demonstrate Probability of Occurrence,

Triangle represent Final Outcome



Results:

There are 112 major thalassemia patients currently living in west Azarbaijan Province. 46 of them has been identified after the beginning of Prevention program. Average coverage of the program during this period was 75%. The Incidence rate of major thalassemia in west Azerbaijan has been demonstrated in third diagram. 46 of these patients were born after the beginning of prevention program and 32 of them were born in last 5 years. Highest incidence rate was in 2004 (28.1%) and average incidence was 19.8 per each 100000 living births. . Only 6 couples had done first step PND and all of them were couples who already had another major thalassemia child. Only one test was positive among them and the child was aborted after getting the legal permission.



Results from decision tree of the thalassemia prevention program: The inferior branch of the decision tree demonstrates the situation in which no intervention performed, so the minor thalassemic couples get married and there is a 25% probability for their child to be a major thalassemia case. The upper branch shows what would happen if a prevention program was preformed. After the screening test, if the couple were both minor thalassemia patients, they would have special consultation and some would be dissuaded while others would get married and risk a 25% possibility to have a major thalassemia child. In next stage the odds and costs of each branch was calculated to make the right decision in the end.



Odds and costs:-

- 1. Odds of a major thalassemia patient being born from a minor thalassemia couple: 25%**
- 2. Minor thalassemia prevalence in community: 1%**
- 3. Average coverage of the prevention plan: 75%**
- 4. Average rate of the marriage dissuasion following consultation: 53%**
- 5. Cost for a Complete blood test: 8500 IR Rls**
- 6. Cost for a pre-marriage consultation: 30000 IR Rls**
- 7. Hemoglobin electrophoresis test cost: 65000 IR Rls**



Considering the annual Birth Rate and the odds of giving birth to 1 child in each family and a 25% possibility of him/her being a major thalassemia case, we came to the conclusion that only with executing the screening program and consultation with couples leading to dissuasion their marriage, at least 235 births with major thalassemia has been prevented. If, according to reports of the ministry of health (MOH) each major thalassemic patient care would cost 6500 US \$ per year (each \$ is 9300 IR Rls), there has been 143 bollion IR Rls saving, which otherwise would be spent on 15 year care of these patients.



Discussion:

The results demonstrated that the coverage ratio of program in the West-Azerbaijan Province is at a desirable level, and has specially experienced a well progress during last two years.

Reducing gene frequency or helping in risk families' having healthy children? Certainly the second one not only is compatible with the general spirit and aim of medical services, but also is achievable and practical. Of course, we cannot achieve this aim by only restricting marriage between minor couples,

Multi-ethnicity is one of main problems in West-Azerbaijan province, which leads to informal registration of marriages by the local Aghedin. But the denominator in calculating this index is registered marriage cases in Provincial registry offices, so it could overestimate the coverage of program. According to the results of screening, Consultation effectiveness index (marriage dissuasion rate) is approximately 53%. All New cases registered in recent 5 years are in families who had a thalassemic child before,



Treatment of a major thalassemic patient with standards of Iran, costs approximately 6500 US dollars a year, and 100000 US dollars for 15 years. This includes only costs for providing Blood and Desferal and some related drugs. Costs of controlling cardiac complications and treatment of liver disease due to Hepatitis C are not included here. Also the salary of each related medical staff and the time each parent spent for his/her child were not included. Estimated cash saving for 235 patients was more than 143 billion IRR (Islamic Republic Rials) (15380 USD). We can compare this with the costs of complete vaccination of children younger than 5 years old which costs 36000 IRR for each one. So by saving the cost of treating 9 thalassemic patients for 15 months, we can immunize almost 200000 younger than 5 years old children against diseases. This comparison demonstrates very appropriate economical beneficence of services preventing the development of new cases. Of course the real cost of giving birth to a Major thalassemic child on family, society and government is much more than this estimation. To improve the measures, provincial authorities suggested having more sensitivity on performing Family planning. A basic strategy should be taken to minimize the native intra-ethical marriages which usually are not registered in national registry system. Educational programs and consultation in any age before marriage should be considered. Even the education could be included in the school lessons.



Suggestions:

Trying to identify most of high risk couples -1

Complete contraception coverage of high risk families with -2
a safe method

using prenatal laboratory diagnostic testing -3

Developing prenatal diagnosis laboratories in the private -4
and public section

Revising screening programs and making appropriate -5
changes where needed

Complete insurance coverage for all parents with the risk of -6
giving birth to a Major thalassemic neonate.



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