

## EVALUATION OF GOITER CONTROL PROJECT IN NORTHERN PAKISTAN

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### Abstract

Northern Hindukush mountainous belt of Pakistan is among the most affected areas of iodine deficiency disorder. It is reported that 70% of the estimated 8.8 million population is at risk of IDD. The government of Pakistan and UNICEF introduced programs to provide protection to the target population. The program included lipiodal capsule to children 5-14 years of age, lipiodal injection to women, provision of iodized salt to the population, education and public awareness. The results show that 46% of the target population has been covered and it reduced goiter prevalence to about 60%. The project failed to collect information on neonatal hypothyroidism and new born cretin. No information was available on education and public awareness. However legislation has been passed by the government that only iodized salt be provided to the population. The iodized salt was not accepted beside cost the perception that government is providing iodized salt for family planning purposes. Public awareness programs can result in achieving sustainable goals.

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Keyword: Iodized salt, goiter, IDD

## Introduction

Iodine is an essential element needed by both human being and animals. Human needs iodine to make thyroid hormone. These hormones are produced by thyroid gland. After formation it travels to the blood. These hormones are essential for normal development of human brain and nervous system.

When people don't have enough iodine they cannot make enough thyroid hormone. This deficiency has several important health hazards and collectively called iodine deficiency disorder (IDD). The consequences of IDD results in goiter (enlargement of thyroid gland) hypothyroidism, cretinism, deaf mutism, short stature, reproductive failure, increase maternal and childhood mortality (1) and also affects socioeconomic development (2) (3).

The Northern mountainous belt of Pakistan is among the world worst affected area of IDD. This area consists of Gilgit, Skardu, Baltistan, Khanjurab, Chitral and Swat in North West Frontier Province. It has been reported that 70% of the population residing in these areas are iodine deficient and are at high risk of developing IDD. Epidemiological model predict 4.3 million people with somewhat reduced mental ability, 16000 still birth per year, 8800 neonatal deaths and ½ million cretins for the endemic areas (4) (5).

Pakistan has a population of 160 million, most of the studies on goiter prevalence are reported for the Northern areas of Pakistan but no survey report data is available except 1 that it is 5% in the plain area of Pakistan (6). Recognizing the problem the government of Pakistan with the help of UNICEF initiated activities to control the situation and to provide protection to the target population estimated at 6.12 million in the Northern areas (4). The objective of the project were to (a) bring down the prevalence in that area to less than 10% (b) incident of neonatal hypo thyroidism to be reduced to less than 1 per thousand (c) 6.11 target population to be covered through lipidiol (d) no more new born cretin (e) establishment of region IDD labs and offices (f) education and public awareness about IDD (g) provision of iodized salt to the population in the endemic area.

The overall program had a three prong approach with 3 component, lipidiol therapy, provision of iodized salt, education and awareness program about IDD. Lipidiol therapy is an activity to provide an immediate relief to the target population over a short period of time. The provision of iodized salt, education and awareness campaign are long term measures to solve the problem (7). According to project methodology undertaken lipidiol capsule were administered to children up to 5 years of age, girls from 6-14 years of age and Lipidiol injection to women of childbearing age, pregnant and lactating women. For promotional and public awareness about IDD a liaison was established within the nutrition section of the planning division Islamabad Pakistan.

Ministry of health, ministry of education and national institute were involved for an effective participation of health and school personnel for awareness about IDD, its related consequences, in the endemic area. Training of field staff and lab staff health workers were conducted before the start of the project. It was proposed that a few iodine testing labs and offices would be established in the area to monitor the IDD situation. The government was requested for a legislation that only iodized salt be provided in the endemic areas. The project was under implementation for more than 7 years till late 90's at a cost of Rs 44 million. UNICEF provided financial support. A consultant, the first author was assigned the task to evaluate the project.

## **Materials and Methods**

Baseline information is prerequisite for any evaluation. Before launching this project, no data was available for the project or for subsequent evaluation. Therefore two questionnaires, one for central level managers (appendix 1) and another for field workers (appendix 2) were developed. The administrative questionnaire was given to the managers for completing during the consultant visit to the site or requested through mail. Similarly, field workers involved in the operation were given the other questionnaire and replies gathered from them. The main objective was to identify constraints in the project implementation by managers and field workers and also to review the suitability of the current institutional arrangement in implementation of the project. Besides these information was also needed on IDD problems among the population and how the project was executed. The two most reliable means for assessing the severity of IDD are (a) prevalence of goiter and (b) urinary excretion of iodine. For the purpose of this evaluation 30 clusters were selected. A primary school in the area was taken as cluster, within each cluster 10 students 6-14 years were selected randomly for physical examination of goiter, while one student was taken/picked up randomly for urinary examination whose urine was collected for iodine content. In this way 300 school children were clinically examined for goiter and identification of lipidol capsules and injection. Further 10% subsample was collected for urinary analysis. All these information were entered on a specifically designed questionnaire.

## **Goiter Prevalence**

Measure of the goal is by observing the prevalence among the population. Estimation of the prevalence requires a physical examination of the thyroid enlargement compared with the normal thyroid. Enlargement when exist is further divided into degree of enlargement. Classification of the goiter size was measured by WHO/UNICEF/ICCIDD criteria (7). For examination of goiter among children and women, the field enumerators were thoroughly trained, field work was conducted under the supervision of the consultant himself. All questions were checked the same day for correction/editing.

## **Urinary Iodine**

Measurement of iodine in the urine provides a good index of the iodine taken in. Since absolute minimums daily requirement is about 50 µg. Urinary iodine level less than 50 µg means iodine deficiency. When mean daily urine excretion in an area is less than 25 µg, cretinism could frequently be found in the population. In the field it is extremely difficult to collect urine passed by the subject during the 24 hr period. Therefore examiners rely on casual urine samples. Two approaches have been used to relate iodine content of the casual urine sample to the 24 hr value. One approach relates urinary iodine to urinary creatinine, a chemical substance which the body excretes daily. Thus one can measure both iodine and creatinine in a casual urine sample and express the result as ratio ug iodine/gram creatinine. The other approach is simply measure the concentration of iodine in the urine as µg iodine per 100 ml of urine. While the subject will vary in the concentration of their urine depending on how much liquid they have been drinking. The variation will tend to even among sample from many subjects (8).

## **Result and Discussion**

The project throughout its operation has not been consistent with its phased way of implementation. When the quantitative measure of data of activity was computed the following results were obtained. A total of 3.75 million services have been performed whereas according to the plan 6.12 million were to be covered. There were 2.82 million coverage through capsule and 0.94 million by injection. The ration of actual to plan activity in terms of quantity is a little more than half of the planned activities actually performed. These results indicate that there would have been greater positive impact of the project if all activities were performed as planned. The average unit cost of each service increased by 63% from Rs 6.8 to Rs 11.1 during operation of the project. While discussing unit cost operational cost is an important factor which remained a hidden factor in this evaluation? No considerations were given to the fact the after 2 years, immunity is lost and the individual will again become the target population. Program resources were utilized very slowly as compared to the plan level. This resulted in failure to perform a number of other activities. Similarly efficiency was considerably less than anticipated in all activities of the project.

## **Goiter Prevalence**

As part of the evaluation the survey conducted by the consultant and his team for this study, information was gathered from school children, women, field workers, managers on goiter prevalence, lipidiol therapy and their urinary iodine excretion level.

The result given in table 1 show that prevalence of goiter was 29% in Northern areas and 27% Northern NWFP. This data when compared with ICCIDD guide for IDD severity and need for correction (2) it was observed that both Northern areas and

Northern NWFP are in moderate stage of IDD severity and the need for correction is urgent Table 1. These results indicate the general trends which may not be representative to overall population of any of these areas.

## **Urinary Iodine**

The concentration of iodine in urine is used as a biochemical marker of iodine deficiency. As 90% of body iodine is excreted in urine and the iodine level in urine reflect the subject iodine intake. Moreover it is easy to obtain and is also stable under field condition. The overall goal in measuring iodine is to correct any existing iodine deficiency. 30 sample of urine were collected 15 from Northern areas and 15 from Northern NWFP and analyzed for iodine content. On comparing the result of these urinary iodine levels with the proposed WHO/ICCIDD criteria (7). Based on median urinary iodine level table 2, it was observed there were 3 cases of mild, 10 cases of moderate and 2 severe cases of IDD in northern areas. While 10 cases of mild and 5 cases of moderate IDD were observed for Northern NWFP. As no follow up work for correction of IDD in these areas have been reported after year 2000 it is possible that IDD situation might have aggravated. Since it is an evaluation study with specific mandate and resources, therefore result are only valid to review in conjunction with the urinary iodine excretion level. The assessment of iodine severity from the 2 sources i.e. prevalence and urinary iodine level used in the evaluation support each other.

## **Specific Results**

The objective of bring down goiter in the target areas to less than 10% was not achieved. Our results show that the prevalence of goiter in Northern areas was 29% while it was 27% in Northern NWFP. The project however reduced goiter prevalence to about 60%.

The second objective of neonatal hypothyroidism was also not realized as no work has been done on this goal. In areas of iodine deficiency where goiter prevalence in above 10%, neonatal hypothyroidism is frequency present. The project failed to collect information on new born cretins.

Information on population coverage has been obtained through a survey according to this 46% of the target population has been covered which is close to half of the target anticipated.

No progress has been made on establishing regional IDD labs or offices for monitoring the IDD situation. There is no information available of public awareness about IDD and its related health consequences in the remote areas. Similarly, no education program was held for the population about the benefit of iodized salt, therefore even when iodized salt was made available, public was reluctant to purchase or consume iodized

salt. Beside the cost the perception that government is supplying iodized salt for family planning purposes. Greater emphasis should have been placed on goiter, IDD awareness campaign through media, village elders and public participation.

### **Recommendations**

The program should be continued with current objective but with greater efficiency rate.

The project was proposed as a backup for long term measures, supply of iodized salt, it might be better to periodically maintain the project every 3 years for the purpose of emergency backup for the vulnerable group.

Legislation should be passed by the government that only iodized salt be sold in goiter endemic areas.

It is extremely important that goiter awareness campaign be carried out with greater emphasis through, mass media, radio education campaign and involvement of village elders, religious leaders and women. Without community participation such projects would fail in the long term

In future the project should have an inbuilt mechanism for periodic evaluation.

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**Table 1: Goiter prevalence**

<b>Area</b>	<b>Goiter Prevalence</b>	<b>IDD Severity*</b>	<b>Need for Correction</b>
Northern Area	29	Moderate	Urgent
Northern NWFP	27	Moderate	Urgent

Total number of clusters 30

Total number of subjects 300

**\*IDD severity and need for correction**

<b>State of IDD</b>	<b>Goiter</b>	<b>Prevalence</b>	<b>Need for correction</b>
Mild	+	5.9-19.9%	Important
Moderate	++	20-29.9%	Urgent
Severe	+++	30% and above	Critical

Source (2)

**Table 2: Severity of IDD based on Urinary Iodine levels**

<b>Severity*</b>	<b>Northern Areas</b>	<b>Northern NWFP</b>
Mild	3	10
Moderate	10	5
Severe	2	-
<b>Total</b>	<b>15</b>	<b>15</b>

15 clusters selected for Northern areas

15 clusters selected for Northern NWFP

**\*Proposed criteria for assessing severity of IDD based on median urinary levels**

<b>Median urinary iodine level mg/dl</b>	<b>IDD stage</b>
<2.0	Severe
2.0-4.9	Moderate
5.0-9.9	Mild
10- >10	No deficiency

Source (7)



## Appendix 2: Evaluation of Goiter Control Program (lipiodol therapy) health workers questionnaire

Name: \_\_\_\_\_

Location/address: \_\_\_\_\_

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(Where this health worker is presently working)

1. Are you involved in goiter control program if yes are you
  - a. Full time employed in the project
  - b. Working as part of other program
2. Do you know about iodized oil injections/capsules?
3. Why is iodized oil injections/capsules given?
4. Who is given these injections/capsules?
5. Do you give these injections/capsules at
  - a. Static health units
  - b. Outreach teams
  - c. Both
  - d. During EPI session
6. How do you select target population for this program?
7. How do you maintain records of individuals covered in the program?
8. Do you have coverage target for each month or week?
9. Is it same all the time or varies?
10. Can you achieve this target conveniently/easily?
11. Is this target realistic to achieve?
12. Have you received any training specifically to manage this project?
13. When was this training given?
  - a. At the time of entry into service
  - b. During service
14. Was this training combined for all workers or individually?
15. How is your work supervised
16. What kind of major and minor problems do you face in implementing IDD program?

Major:

- I. \_\_\_\_\_
- II. \_\_\_\_\_
- III. \_\_\_\_\_

Minor:

- I. \_\_\_\_\_
- II. \_\_\_\_\_
- III. \_\_\_\_\_

17. Do you feel that implementation (in terms of performance) of this program had been

Very good	Good	Adequate	Poor	Very poor

18. Any Suggestions to improve the performance of this program:

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