SCREENING FOR IODINE DEFICIENCY – MORE THAN A MEDICAL APPROACH

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Abstract

Working as a team began more and more important in many fields, including medicine. After an era of fragmentation, when the need of deepen the knowledge led to supra-specialization, we witness now the reassembly of these distinct parts, in order to obtain a comprehensive view. This is true not only for research, but also for the clinical practice. We present the building of a team who started with a screening and continued with other evaluations in a city from the eastern part of Romania. The goal of the study was to evaluate the iodine status in a former iodine deficient area. Two parameters were necessary, evaluation of thyroid volume and urinary iodine in a representative group of children. The initial pure endocrinological team increased by adopting new members: medical (nurses, epidemiologist, biochemist) and non-medical (schoolteachers). The results induced new studies and the team had growth and proved the utility of interdisciplinarity.

Keywords: Iodine deficiency, interdisciplinarity, children evaluation

No man is an Iland, intire of itselfe;
every man is a peece of the Continent, a part of the maine.
MEDITATION XVII, John Donne

Introduction

The huge amount of knowledge, in all science fields, led to division in numerous sub-specialties. These (limited) domains permitted a detailed examination of specific problems. However, this approach has two main limitations. First of all, a single, isolated discipline may distinguish the details but cannot offer a global image of the investigated problems. On the other hand, not every problem has its one "appropriate discipline", and their complexity

makes necessary a complex approach, from several subspecialties, sometimes even from specialties of different fields of knowledge (Lingnan, 2011). Interdisciplinarity means more than putting together different disciplines which keep their one point of view, as in pluridisciplinarity, it presumes a true connexion of different methodologies, an integration of particular aspects of knowledge (Zaman&Goschin, 2010).

Medicine is one of the best models of the necessity of interdisciplinarity and even transdiciplinarity, especially in research and politic of health fields. National health programs are an example of application of epidemiological, clinical, social, and economic data in order to solve or at least diminish a general problem of health. We present our self experience of screening for an endemic problem in the eastern part of Romania. Moldavia.

Study presentation

On the last decade of the 20th century iodine deficiency was not yet solved in Europe. From the last WHO, UNICEF, and ICCIDD settlements a region is considered iodine deficient if more than 5% of the population have goiter (or thyroid volume more than 97 percentile) and median urinary iodine (good marker for iodine intake) is less than 10 μg/dL. At that time, reevaluation of iodine status had shown that, in spite of salt iodination, iodine deficiency (IDD) was controlled in only 5 European countries, persisting, from minor to severe, in the rest of the continent. Starting from these data, a project named ThyroMobil evaluated iodine deficiency in 12 countries, including Romania (Delange, 1997). However, none of the 3 investigated Romanian zones was in Moldavia. We decided to evaluate the iodine supply in some Moldavian regions, starting with the main city (Iasi), previously considered with minor to moderate IDD, and to compare the results with data from other Romanian and European regions

According to WHO definition, goiter prevalence and urinary iodine are the best parameter to evaluate IDD. Goiter prevalence is nowadays appreciated by ultrasonography, most accurate than palpation, being a quantitative and not qualitative method. Urinary iodine offers an image of recent dietary iodine intake. It is considered the choice index for evaluating and correcting iodine deficiency (Preda, 2014). As well as ThyroMobil study, our study also was performed in schoolchildren. Schoolchildren are considered one of the best target groups, both because their thyroid vulnerable to iodine deficiency, offer a better image of the iodine status, and the selection and survey of a children group is more practical(Zygmunt, 2012). The initial team was composed by of few enthusiastic endocrinologists.

Establishing the **study design**, some unexpected problems arrived.

First, we needed to choose a representative sample. Iasi is a city of 300,000 stable inhabitants, with 13.5% children between 5 and 18 years old, with an equal sex distribution. However, the problem was not the number of children, but their family environment, since alimentary habits were important for our research. We asked the help of an epidemiologist who selected schools with a representative variety of children. After selecting the schools, we needed the informed consent of children tutors (family and school), so we had to discuss with the teacher and to explain our goals. On the initiative of a young team of schoolteachers, there were established meetings with the parents, where we did explain the procedures and the goals of our studies. There were no invasive methods and practically all the parents permitted their children to enter in the study.

We have examined 914 children (466 boys and 448 girls) with a mean of 9.76±4.04 years of age. The including criteria were residency in the Iasi city and the absence of any known thyroid disease or capable to influence nutrition status and/or thyroid function. The study protocol included general examination, with evaluation of height, weight (by a nurse), and puberty stage (by a physician), thyroid ultrasonography, and urinary sample (taken by a

nurse and analyzed by a biochemist). In order to avoid inter-observer differences, all thyroid ultrasonography were performed by the same physician.

Some important issues have emerged, which deserve to be mentioned since they were different of the expected results and some of them have been bases for other studies:

- Urinary iodine was realized at 10% children, by randomization (minimum 2 children for every age and sex). Mean value was 9.93μg/dL, at the inferior limit of the normal (WHO recommendations), pleading for minor IDD.
- Mean thyroid volume (tab.1) was close to the values from regions with sufficient iodine supply (with the exception of teen-agers, with a slightly higher volume). Superior limit of the thyroid volume (97 percentile) was smaller than that proposed by the ThyroMobil study. We considered our limit more appropriate for the evaluation of IDD, since using the ThyroMobil results; goiter prevalence had an unrealistic value of 0.1%, uncorrelated to the other data. With our one limits, goiter prevalence was 4.5%, under the 5% limit for IDD. Our skeptical view concerning the accuracy of ThyroMobil limits for all European countries was confirmed by other researcher (Liesenkötter, 1997).

Table 1. Mean thyroid volume in children

Author		**Mean thyroid volume (mL) / Age (years)**									
		6	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Delange, 1997 Europe	girls	4.9	6.3	6.7	8	9.3	9.8	11.7	13.8	14.9	15.6
	boys	5.4	5.7	6.1	6.8	7.8	9	10.4	12	13.9	16
Liesenkötter, 1997 Germany	girls	3.7	4.5	4.5	4.5	4.9	7	8.6	9.5	10	9.5
	boys	3.2	3.7	3.9	3.8	4.4	6.8	6.9	6.9	8.2	7.2
Vulpoi, 1997 Romania	girls	3.1	3.4	4.5	5.4	6.3	8.3	8.3	9.8	11	10.7
	boys	4	3.2	3.7	4.9	6.5	7.1	6.4	7.9	12.3	12

- Corroborating the two parameters we could affirm that Iasi region is one of borderline iodine deficiency, showing a significant improvement comparing to anterior data, mainly due to salt iodination. These data convinced us to extend our study and we have evaluated in the same manner iodine status in 3 other regions of Moldavia. An improvement was remarked there too, from medium/severe to mild/medium deficiency.
- Since the clinical examination included anthropometric parameters, we have noticed the secular trend of height enhancement (tab.2). This was a good argument to evaluate a larger cohort, which confirmed the first results (Vulpoi, 2005). The most significant difference in linear growth, comparing to older growth chart, was found at the age of 11, probably due to earlier puberty onset. Children linear growth is evaluated using growth charts. Due to inherent differences between geographical regions, global growth charts may not be appropriate for all zones (Bonthuis, 2002). National growth charts should be used, but in Romania they date from decades. A study with a representative sample for at least the region of Moldavia is programmed this year.

Conclusion

Although unique by the main determinants and the clinical approach, endocrinology is a frontier discipline, interfering with many other specialties. In the field of science, this means that any discipline will bring its own point of view and try to harmonize it with the others, realizing “hybridization”, a zone prone to innovations and capable to identify errors of the constitutive disciplines (Chettiparamb, 2007). In the clinical field, the interdisciplinarity comes natural, since every disease is a sum of different interacting factors.

Table 2. Height evolution

Age (years)	Height (cm)			
	Boys		Girls	
	1979*	1997	1979*	1997
3	96.5	96.7	95.3	97.1
4	101.6	106.3	100.9	105
5	108.9	113.7	108.4	113
6	115.5	120.9	114.5	120
7	119.9	126.8	119.2	124.8
8	126.4	128.3	126.7	129.2
9	132.4	134.8	131.6	134.5
10	136.4	142.3	136.4	146.5
11	141.3	149.7	142.5	153.9
12	147.7	150.7	149.3	154.1
13	152.6	159.7	154	155.9
14	160.3	166.4	157.4	161.5
15	165.1	169.4	158.4	161.1
16	171.3	174.2	159.1	162.9

*-national growth chart

In the late 90's interdisciplinarity was not clear defined, in Romania as in other places (Nair, 2008). It is now, when isolated work is increasingly less conceivable. "Consultation, examination solicitation, prescription" is no more sufficient in the view of this paradigm shift (de Lorenzi, 2009).

We performed a study which we considered first easy to realize, with a purely endocrinological team. The subject was clear, the methods easy to perform. However, even in this simple problem more than one provider had to interact. More than that, not all of them were health professional. This enlarged team permitted not only the goal achievement, but also opened new gates for other (interdisciplinary) studies.

Contribution of the authors: study design CV, DA, CP; meeting with the parents IVN, CV, MCU; patients examination CP, MCU, MA; ultrasonography CV; results redaction and analyze CV, MCU, DA, IVN, MA, CP

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