

Research possibilities in measuring allergic morbidity, using empirical data

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Abstract

There is lack of data about allergic morbidity on neighborhood; city district or micro regional levels, thus increasing focus have been put on morbidity of localities in epidemiological and health geographical studies. The aim of the study is to outline the best possible empirical research methods for allergic morbidity. Self-assessment based survey was made twice in Kecskemét, Hunyadváros district of 8000 inhabitants, Hungary, to elucidate the allergic prevalence. The survey units were the households, but the analysis was made on the diseased people. Firstly 419 members of 148 households and secondly, during the repeated survey 401 members of 138 households were asked. Two-staged multistage sampling had been made, at first, one third of the district's streets had been chosen randomly. Secondly according to the size of the streets a probability proportionate to size sampling method was used. Almost 40% of the households and 20% of the researched group showed allergic morbidity. According to the results, it can be assert, that around 20% of the population of Hunyadváros district suffers from some kind of allergic disease, which is overwhelmingly larger than official statistical data shows.

Keywords: *health inequality, neighborhood health, Kecskemét, morbidity, rhinitis allergica*

Rezumat. Posibilități de măsurare a morbidității alergice, folosind date empirice

Deși există puține date referitoare la morbiditatea alergică la nivel de cartiere, districte ale unui oraș sau la nivel microregional, tot mai multe studii epidemiologice și de geografie medicală se axează pe morbiditate la nivelul unor așezări. Scopul acestei lucrări este de a sublinia cele mai bune metode empirice de cercetare a morbidității alergice. Pentru aceasta am desfășurat două studii de evaluare în Kecskemét, districtul Hunyadváros, cu 8000 loc, din Ungaria, în încercarea de a stabili prevalența alergiilor. Mai întâi, am intervievat 419 membri din 148 de gospodării, apoi 401 membri din 138 de gospodării. Selectarea s-a făcut în mai multe etape, la început alegând la întâmplare o treime din străzile din district. Apoi, în funcție de mărimea străzilor, și conform metodei de stabilire a eșantionului, am ales eșantionul. În aproape 40% din gospodării și 20% din populația intervievată prezintă cazuri de morbiditate alergică. Conform rezultatelor, putem afirma că aproape 20% din populația districtului Hunyadváros suferă de un anumit tip de alergie, această proporție fiind mult mai mare decât cea figurată în statisticile oficiale.

Cuvinte-cheie: *inegalități de sănătate, sănătate a cartierului, Kecskemét, morbiditate, rinită alergică*

Introduction

Health inequality is a major topic of medical geography, which focuses on social aspects and spatial distribution on different scale (SMYTH, 2008).

Prevalence of allergy is increasing within the population, not only a major issue in Hungary, but a global health problem which is affecting people from all countries – from developing to more developed – ages and ethnic groups (BOUSQUET. ET.AL. 2008). The differences within prevalence can be measured on subnational levels as well, which show health inequalities within society (ZANOLIN ET AL 2004). More and more studies are examining the spread, the territorial structure and spatial differences of allergy; despite the growing significance of the topic, there is still lack of geographical data on smaller (neighborhood, district) scale. Moreover, statistics shows only recorded morbidity, which is lower than the actual prevalence. The main questions of the paper are linked with the mentioned facts. Why is it important to measure morbidity on smaller scale? How can we measure the actual morbidity, which includes the symptomatic, and the latent morbidity within the population? The definition, the cognition

and the structure of morbidity will be introduced first; thereupon the results of the inquiries' will be reviewed, focusing on allergic morbidity in Hunyadváros district, Kecskemét, Hungary (Fig. 1).

Health geography, scale and morbidity

In recent medical geography researches, the role of space and place had increased (KEARNS&JOSEPH, 1993, KEARNS, &MOON, 2002, PÁL V. 2005). These definitions are not only considered as concepts, but constantly renewing, changing products of the society. Space and place is produced by interactions of people and their environment (LEFEBVRE, H. 1991). Thus, understanding space requires understanding localities. To reveal the spatiality of health, a wider scale approach is needed.

The question of scale is crucial in every work. It is a highlighted debate among scholars, hence the problems which result in inequity are often derived from a higher scale, and thus, by far the perceived outcomes are local. The wrong choice of the scalar unit can drive to ecological fallacy and deflecting the facts. Up-scaling can hide the spatial patterns due to its generalising feature, downscaling can cause the

“single issue problem” which can never give decent tackle for a diverse phenomenon (WILLIAMS, 1999). A Growing number of researchers agree that

neighborhood and individual (often referred as body) levels are applicable to measure inequality in health (CURTIS, 1990, FABULA, 2012).

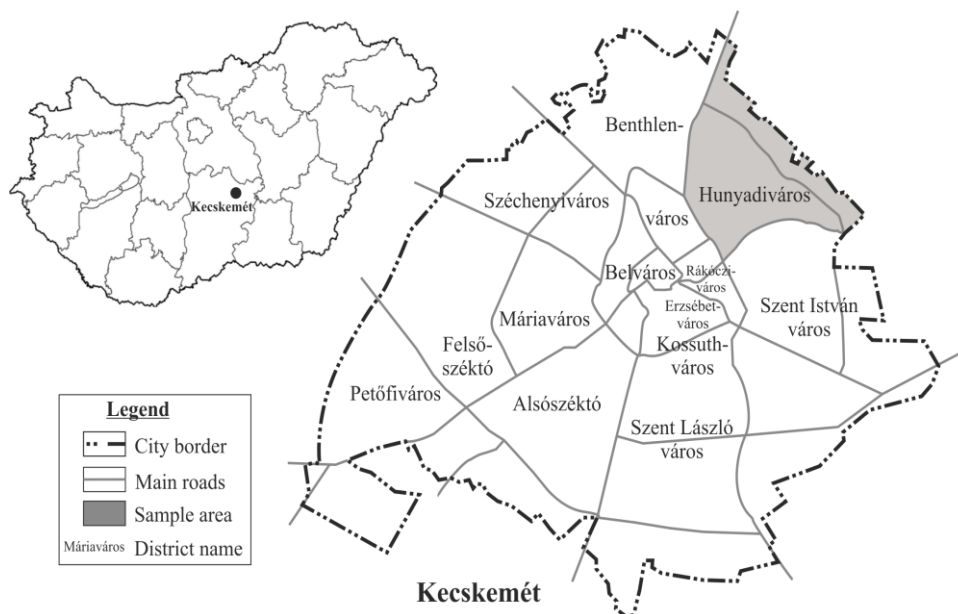


Figure 1: Kecskemét and the sample area. (Edited by authors)

Neighborhood is a level of scale on one hand, and in another it is unit of analysis, which is appropriate to examine local activities and processes (MEADE & EMCH, 2010). As it was mentioned earlier, more focus was put on the individual and neighborhood level while health status is highly influenced by local environmental factors and circumstances (KEARNS & JOSEPH, 1993). In several cases, the exposition to environmental threats and hazards can negatively affect health status and everyday life thus studying so called environmental and social injustices – appearing on local and mostly on neighborhood scale can be crucial research direction of geography, including medical geography (WALKER, 2006, HARVEY, 1996).

Individual level has also high role in medical geographical research since differences in lifestyle can entirely change possibility of evolution of an illness, the increase of risk or can worsen health state. Several individuals with the same lifestyle and exposition to environmental harms form pattern on a larger scale. In this sense, health inequalities depend both on small scale – local – and higher level processes, decisions and policies (MEADE& EMCH, 2010, SMYTH, 2008), thus a multiscale perspective is needed in these studies (MEADE & EMCH, 2010).

In case of allergic morbidity, the applicable unit of the analysis is the scale of individuals and small neighborhoods, so it gives guarantee of no data reduction.

Main concepts of morbidity

Basically, two indicators can be used for describing health status of the population. One is the morbidity

with no punctual data; the other is mortality, which is comprehensively registered. (BALÁZS, 2004, DÉSI, 1998, NAGYMAJTÉNYI, 2006, 2010).

Actual morbidity cannot be fully recorded; therefore, researchers determine symptomatic and latent morbidity. Foregoing means registered and recognized patients of health care system, latter means those people who are not registered, whose illness is not accurately recorded, and those who were registered with different disease. Sometimes diseased people are not recorded, whilst they often do not recognize the symptoms, or they identify them as a side effect or a part of their everyday life (BOUSQUET, 2008). To present the differences between symptomatic and latent morbidity see Figure 2 about the iceberg-concept.

The overarm part represents the recognized morbidity; the underwater illustrates the latent morbidity, those people who are excluded from statistics (BALÁZS, 2004, DÉSI, 1998, NAGYMAJTÉNYI, 2006, 2010, PÁL, 2002a). In order to get data about symptomatic morbidity, researchers can use four sources in Hungary: statistics of National Health Insurance Fund Administration, statistics of obligatorily declared illnesses, different health registers, patient reporting of health institutes (BALÁZS, 2004, DÉSI, 1998, NAGYMAJTÉNYI, 2006, 2010). The latter represents only the usage of the health institutes, but not the actual number of diseased people (SZÉLES, 2005). There are some further limitations of using the mentioned health databases, like providing only larger territorial scale (county, region, micro region), but less data available

for settlement or district scale (NAGY & BÁN, 2012, PÁL, KISS & TIPEI 2006, PÁL & TÓTH, 2007).

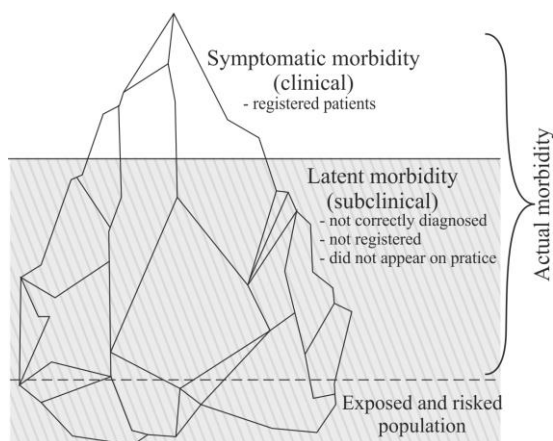


Figure 2: Iceberg-concept of morbidity

Source: DÉSI 1998 edited by authors

The latent morbidity can be observed via cross-sectional screening and longitudinal household researches (DÉSI, 1998, BALÁZS, 2004, DE ANDRADE et al. 2008, NAGYMAJTÉNYI, 2006, 2010). The advantage of the preceding method is the impartiality and reliability, however it is really expensive. The latter strategy is relatively cheap and easily feasible, still the self-assessment considerably depends on one's health literacy and knowledge of diseases. Not only can the cost-effectiveness be mentioned as a merit of these types of research strategies, but these provide information about the subjects' lifestyle and life circumstances. One of the most important self-assessment based health state inquiry is the National Population Health Survey. These kind of national surveys do not provide relevant geographical information, merely on national level (Pál, Kiss & Tipei, 2006, Pál & Tóth, 2007), at the same time some micro regional analysis had been made (Pál, 2002b).

Difficulties in recognizing and following up allergic morbidity

Numerous difficulties occur due to the above mentioned factors during examining allergic respiratory morbidity. The National Korányi Institute for Tuberculosis and Pulmonology is responsible for recording the morbidity of 'Rhinitis allergica' and 'Asthma bronchiale extrinsic' – according to patient numbers –. While the institute has punctual and available data about asthmatic morbidity on various levels from mezzo to macro level, the morbidity in rhinitis allergic is only available on national level, since in recording and treating the latter mentioned illness is competent. Therefore, the actual morbidity by no means, the symptomatic morbidity is partially presented.

Several diagnostic problems occur during the examinations, which also disfigures actual data. For example, until 2004 numerous patients with chronic obstructive airway disease were diagnosed and treated as asthmatic patients. The shift in medicine subsidy resulted in the turning point in this question (JÓNÁS et al. 2008). Besides, children with asthma are not recorded in pulmonary treatment centres, some patients are treated at GP's order. Moreover, the number of patients with rhinitis allergic has decreased in the last years, due to cessation of specialists' pharmaceutical support. Long term increasing stopped (KOVÁCS et al. 2012).

The number of recorded rhinitis allergic patients had increased since the transition until 2009. Initially the number of rhinitis allergic patients was below ten thousand, which had been growing 30 times more during 19 years. After the cut on the medicine support, only within two years the recorded number decreased by 6000, reaching 302 thousand (see Fig. 3).

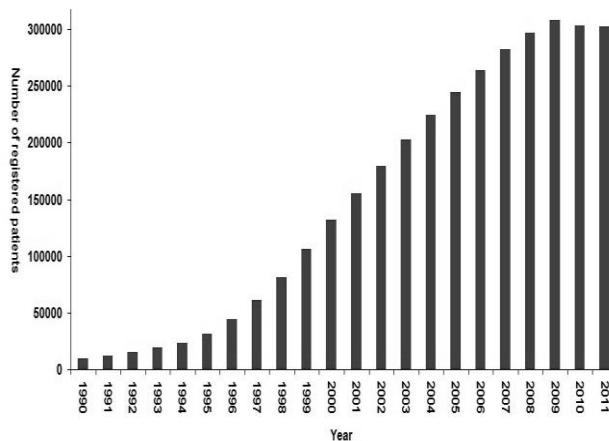


Figure 3: Prevalence of rhinitis allergic patients in Hungary (1990-2011)

Source: National Korányi Institute for Tuberculosis and Pulmonology, edited by authors

In 2011, less than ten thousand rhinitis allergic patient were newly recorded, providing the same value as it was in 1995 (see Fig. 4.).

Another difficulty keeping the register complete is the lack of public information about the age and gender of the recorded patients. Moreover, during the registration process patients are not registered according to residence, but the place of treatment, although the service area of the treatment centres is roughly the same as micro regions. General practitioners' registers also provide information, but allergic morbidity is only recorded if the illness is associated with serious illnesses, like asthma, or the patient was registered after a consultation by specialists. In addition, there are more problems due to incompatible practice area and geographical levels, while doctors provision for patients beyond their

practice area. This causes tremendous limitation of use for available data (Nagy & Bán, 2012).

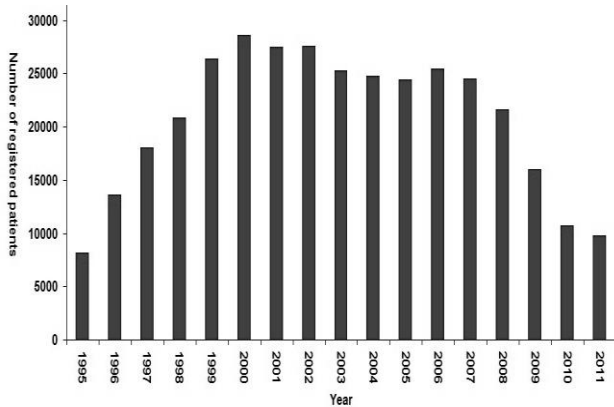


Figure 4: Newly recorded (incidence) rhinitis allergic patients in Hungary by years (1995-2011)

Source: National Korányi Institute for Tuberculosis and Pulmonology, edited by authors)

Method

The study area is situated in Kecskemét, Hunyadváros district, and it was chosen due to several reasons. One fundamental determinant is the size of the study area. It is small enough to examine and identify process like allergy, but not

too large to aggravate the survey. Besides, the district is more exposed to allergic morbidity while it is situated on sand and loess. The sample area is an outskirts of the city which eases the access of the subjects, additionally uncultivated, weedy lands also raises the exposition for allergy.

To reveal latent morbidity, longitudinal survey was made, which was easy and cost-effective; however, the results of a sufficient sample size for certain representativeness errors (age, gender) are capable to approximate actual morbidity allergies of inhabitants on district level. Two self-assessment based surveys were carried on from December 2009 to January 2010 and from October to November 2010. The survey units were household members who have suffered from some kind of allergic disease. Self-administrated, anonymous questionnaires were asked by survey interviewers.

During the research, multi-stage sampling method was used, streets from the district were chosen by systematic sampling after dividing the district into smaller parts. All of the districts' streets (approx. 75-80) were listed in alphabetic order and were given a unique number (Fig. 5).

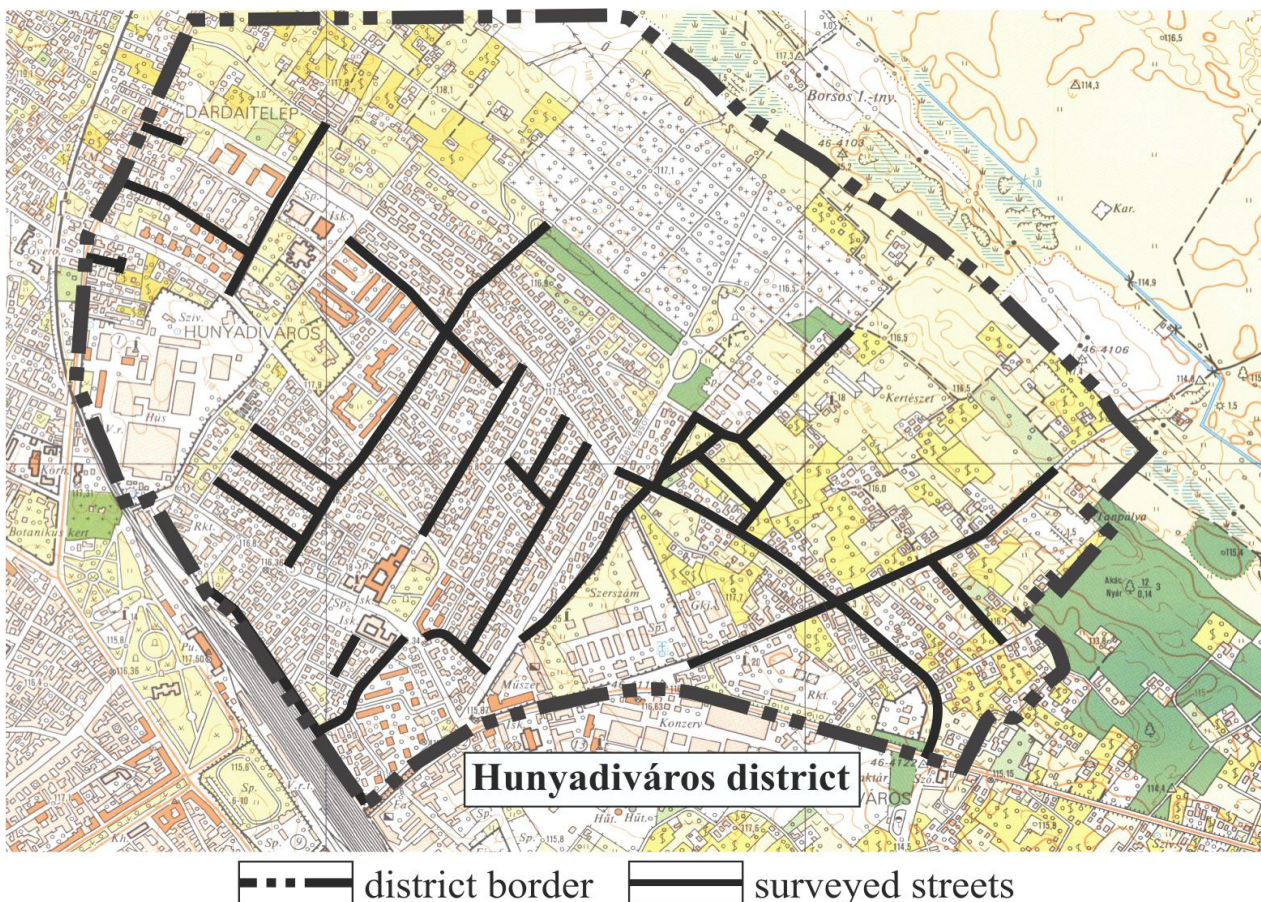


Figure 5: Sampling area. Edited by the authors

The first street was chosen with random number generator and every third was taken into account. As a result, one third of the streets were chosen. Within the streets the households were randomly, but probability proportionately to size chosen (see Table 1).

Table 1: Street size definition and the method for proportionately size sampling

Size of the street (number of houses)	Questionnaires asked
1-4	1
5-8	2
9-12	3
13-16	4
17-20	5
21-24	6
25-28 etc.	7

Source: edited by authors

Preliminary field work had been made to define the sizes i.e. numbers of houses on the streets. In case of the apartment houses, one staircase was chosen, and from every floor a flat was surveyed.

Discussion

Researching the frequency of allergic morbidity in case of Hunyadváros district

According to the City statistics of Kecskemét 2010, the population of Hunyadváros district was 7771 citizens. The survey was asked in 286 households (with 21 refusals), approx. 800 people which means approximately 10% of the population. Allergic morbidity was found in 40% of the households, the affected population is 20% (Table 2).

Table 2: Allergic morbidity by households and persons

Survey	Households					
	allergic		non allergic		total	
	pcs	%	pcs	%	pcs	%
1.	58	39,19	90	60,81	148	100
2.	56	40,58	82	59,42	138	100
Survey	Person					
	allergic		non allergic		total	
	person	%	person	%	person	%
1.	82	19,57	337	80,43	419	100
2.	78	19,45	323	80,55	401	100

The table also confirms the fact that 15-22% of the Hungarian population is affected by rhinitis allergic diseases (Who, 2003, 2007, Nékám 2009).

Examining the gender of allergic morbidity shows adverse results. For the former survey, more male proved to be allergic, while during the latter female population were prevalent (Fig. 6).

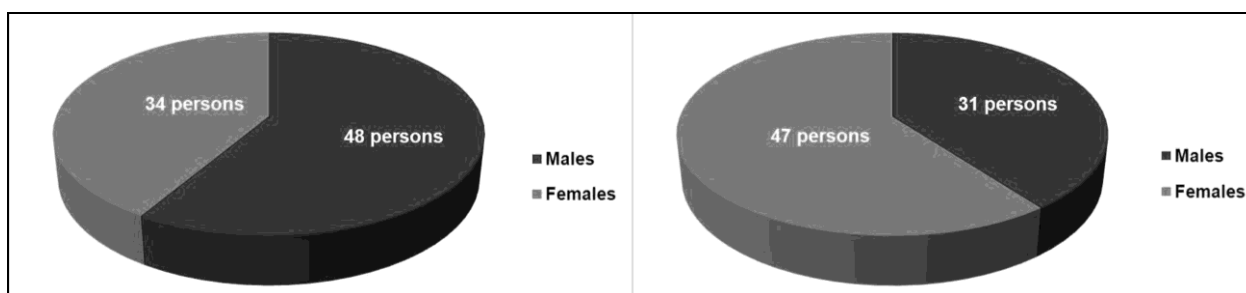


Figure 6: Sex ratio in the first (left) and second (right) survey. Source: survey

Observing the health statistics it seems that more female allergic morbidity is recorded, probably due to psychological factors, and male patients visit doctors more seldom than females. Actually sex does not influence the prevalence of allergies radically (Nékám, 2009). Differences might occur due to the differing numbers of the transponders during the two surveys.

The age distribution of the questioned diseased people is the same conversely to the sex ratio. Two

major groups can be defined; a young adult and middle-aged group and an elderly group (Table 3). Usage of the data is limited due to small sample size and question of representativeness.

Allergic morbidity can be evolved from various causes. The most common allergens are pollens, dust, food, medicine components, feather and fur etc. Chemicals or metals can also be allergen. Questioned people marked several allergens responsible for allergic morbidity. The most indicated was pollen

followed by dust food and medicine components (Table 4). Examining the results of the second survey there is no significant difference in indication of the

latter mentioned three allergens conversely to the results of the first survey.

Table 3: Allergic morbidity by age

Age distribution – 1 st survey											Total
Age	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	n.r.	0-90
Person	5	10	12	14	9	7	12	11	1	1	82
%	6,10	12,20	14,63	17,07	10,98	8,54	14,63	13,41	1,22	1,22	100
Age distribution – 2 nd survey											Total
Age	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	n.r.	0-90
Person	7	10	12	14	6	10	7	11	1	0	78
%	8,97	12,82	15,38	17,95	7,69	12,82	8,97	14,10	1,28	0	100

Source: survey

Table 4: Mostly indicated allergens

Most often indicated allergens	1 st survey		2 nd survey	
	person	%	person	%
Pollen	60	73,17	58	74,36
Dust	16	19,51	8	10,26
Food	11	13,41	8	10,26
Medicine	10	12,20	8	10,26
Fur	7	8,54	3	3,85
Mildew	4	4,88	2	2,56

Source: survey

The second survey was extended with a question with crucial importance in the context of the allergic morbidity concerning the time of appearance of allergies. Their prevalence has increased since 1990, which originates from various causes. One of the most important causes is the neglect of recording allergic morbidity before transition; until 1985 rhinitis allergy was not registered as an illness (Fodré, Lajos & Ladányi, 1994). Additionally, allergy was not as widespread disease as nowadays, while more and more people is exposed to the „western type of life“ which means higher exposure to urbanisation and its demerits, chemicals, overuse of medicines and so on (SZALAI 2005, BOUSQUET, 2008). The so-called hygiene theory, which explains the negative effect of over sterilized circumstances on human health approve the above discussed facts. Due to the overly sterile environment of our

everyday life, the prevalence of allergic rhinitis is increasing in the developed countries (Meade& Emch, 2010, Reid, & Gamble, 2009).

The results should be accepted and used cautiously taking age into consideration as influencing factor. The survey showed that more than the 25% of allergic people is suffering from the disease from birth or childhood, raising the question of genetic influential factors (Bousquet, 2008) (Fig 7).

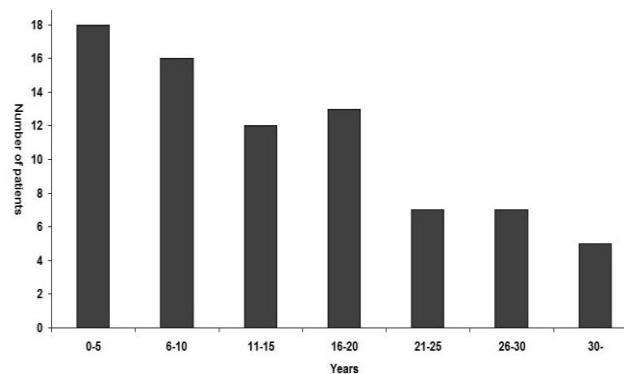


Figure 7: Recognized symptoms in years

Source: survey

We also examined the usage of the available health care services. According to the results of the first survey, 50% of the subjects already visited their general practitioner, this result being confirmed during the second survey, but with higher ratio (Table 5).

Table 5: Appearance at GP's order and SC's order within allergic people

Surveys	General Practice order					
	appeared		not appeared		unknown	
	person	%	person	%	person	%
1 st survey	49	59,76	32	39,02	1	1,22
2 nd survey	59	75,64	19	24,36	0	0
Surveys	Specialist Consultation order					
	appeared		not appeared		unknown	
	person	%	person	%	person	%
1 st survey	48	58,54	33	40,24	1	1,22
2 nd survey	53	67,95	25	32,05	0	0

Source: survey

Less, but significant share of the affected people visited specialists' consultation (SC's) (pulmonology or dermatology); however, the rate of those who are not aware of their illness is really high. There is also a huge difference between specialists' consultation and general practices, whilst the latter not always treats, but it only records allergic illness.

There is a fact; those who have already appeared at Specialists' Consultation order never go back for control. After recording allergy, 50-75% of the patients do not return for follow-up, or supervision. Only 50% of the visitors visit SC's order merely once a year (Fig. 8).

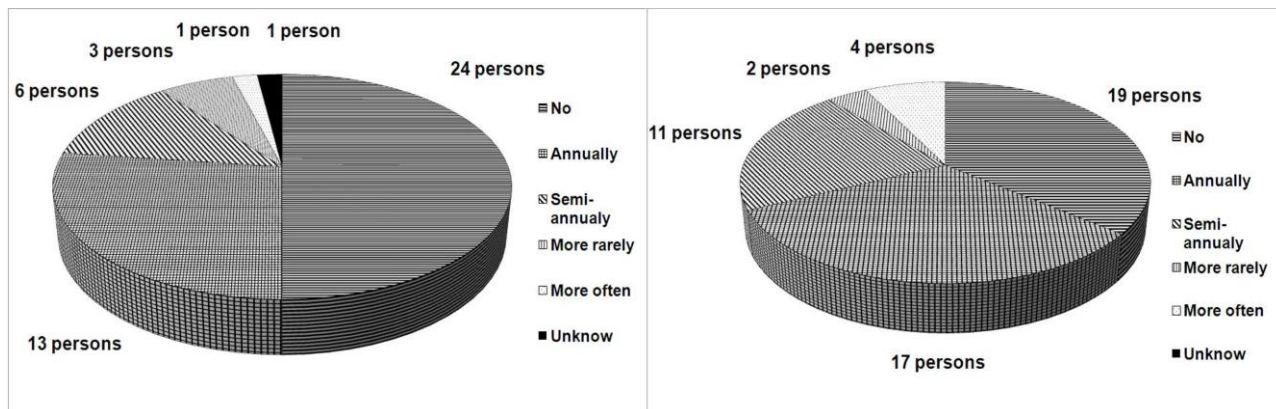


Figure 8: Visiting Specialists' Consultation according to the first (left) and the second (right) survey

Source: survey

In the last year, more than half of the respondents of the first survey, and two third of the second survey respondents were treated. Out of them 50% took medicine, but numerous alternative therapies, like herbal products, antioxidants, salt, light or air therapy were used to preserve their health.

During the research, we put focus on asthmatic morbidity since allergy and asthma are concomitant.

Several surveys and papers verified co-morbidity of Asthma and Allergic Rhinitis (ESTELLE, & SIMONS, 1999, DE ANDRE. et al 2008, KO, et al 2010, IZQUIERDO-DOMÍNGUEZ et al. 2012). Not every allergic is asthmatic, but almost every asthmatic is allergic; that is why one third of the allergic persons are asthmatic and two third of the asthmatic are allergic (KOVÁCS G. et al. 2012), its result being verified by the surveys (Table 6).

Table 6: Asthmatic morbidity within allergic respondents

Surveys	Respondents							
	Asthmatic				Non Asthmatic		Total	
	Asthmatic and allergic		Only asthmatic		person	%	person	%
	person	%	person	%				
1 st survey	15	3,58	4	0,95	400	95,47	419	100
2 nd survey	19	4,74	4	1	378	94,26	401	100

Source: survey

Conclusion

The territorial differences in health state can be studied on various scale, however the latest medical geographical researches put more focus on the lower scale, such as individual and neighborhood level. In this paper allergic morbidity was studied on district level since no data was available on smaller scale and larger scale would veil the differences and connections.

There is significant difference between actual and symptomatic allergic morbidity, which is originated in the latent, unknown morbidity. Allergy is a

widespread disease which latent part easily can be estimated by using self-assessment based surveys.

Two surveys were made as part of the research and same results have been presented which gives reliability to the research. Still we must be precautious when we use, because representativeness is not provided in several senses; on the another hand self-assessment based surveys considerably can disfigure results due to different health literacy and life circumstances. To reduce the disfiguring influence of the latter factor researchers should organise screening for the subjects, yet it is excessively expensive, and besides it should have been extended with surveys elaborating living circumstances.

As a consequence, health status examinations are time and cost consuming, at the same time surveys are feasible and can provide reliable information.

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