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Implications of Incidence Rates of Diseases at Local Level in Family Medicine

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Abstract

Objectives: Evaluate the incidence rate and possible subsequent interventions in a small geographic area, of 15 selected chronic diseases, as a basis for possibilities of continuity of care in family medicine.

Material and methods: We collected data for one year, in a family medicine office that has a list of 1,800 people over 14 years of age and who were treated continuously during the year for; new cases of five diseases whose etiology is understood sufficiently for prevention (coronary heart disease, adverse drug reactions, pulmonary tuberculosis, stroke, traffic accidents), five diseases whose etiology is only partially known but for which there is proposed screening or prevention (breast cancer, bladder cancer, prostatic hypertrophy, hypertension and genetic diseases) and five diseases whose etiology is not well known and where it is not possible to implement prevention or screening (senile dementia, hyperparathyroidism, ovarian cancer, Paget's disease and lymphoma). The consultations were conducted in the neighborhood of Toledo Industrial (Toledo, Spain), which has about 20,000 inhabitants, predominantly young. Diagnoses were made based on symptoms, analytical data or other additional relevant information. Diagnostic criteria of the International Classification of Health Problems in Primary Care, in its "Definite" version were used.

Results: An incidence rate for both sexes and for 1,000 people which ranged from 3.9 new cases per year in traffic accidents, to 0.6 new cases per 1,000 people for pulmonary tuberculosis, genetic diseases, ovarian cancer, lymphomas and Paget's disease, respectively, was found.

Conclusions: The continuity of care, that characterizes family medicine, has important epidemiological connotations, allowing the knowledge of incidence rates of diseases in a small geographic area, which can have epidemiological characteristics and specific needs, especially in our study in the new cases of five diseases whose etiology is understood sufficiently for prevention (coronary heart disease, adverse drug reactions, pulmonary tuberculosis, stroke, traffic accidents).

Keywords

Family medicine, Uses of epidemiology, Incidence, Continuity of patient care, Geographical localization of risk

Introduction

The person is the center of interest for the family doctor; but the person must be seen in context. To do this correctly there must be adequate assessment of not only "what health problems there are", but "how many there are and where are"; the incidence and prevalence.

The importance of epidemiological research at the family physician level, not only in collaborative work or networks, but also individually is often forgotten. This epidemiological level today is downplayed or underestimated; however, there have been family physician pioneers who studied the epidemiologic problems of their community with scientific rigor. Some of them have been recognized for their seminal work in the last 125 years [1-9]. Because of their detailed reports, they were able to discover what was contained in their practice, improve their clinical tasks and calculate rates of disease and relate them with the necessary services. These pioneers made much of this original work based on their observations of individuals for years; it is what we call "continuing care" [10]. So, one of the advantages of continuity in family medicine, is to know the incidence rates of disease.

In this context, the aim of our study was evaluate the incidence rates and possible subsequent interventions in a small geographic area, of 15 selected chronic diseases: five diseases whose etiology is understood sufficiently for prevention (coronary heart disease, adverse drug reactions, pulmonary tuberculosis, stroke, traffic accidents), five diseases whose etiology is only partially known but for which there are proposed screening or prevention approaches (breast

Table 1: Incidence rates of 15 selected diseases.

Diseases		Incidence rates per 100,000 people (Incidence Rate per 100,000 people = 100,000 x incidence rate by 1,800 people*/1,800)	Rates per 100,000 people according to the literature
Diseases whose etiology is understood sufficiently for prevention	Coronary heart disease	111	108
	Adverse drug reactions	167	300
	Pulmonary tuberculosis	56	15
	Stroke	111	552
	Traffic accidents	389	NA (if injured included)
Diseases whose etiology is only partially known but for which there are proposed screening or prevention approaches	Cancer breast	111	86
	Bladder cancer	111	32
	Prostatic hypertrophy	111	NA
	Hypertension	222	900
	Genetic diseases	56	12
Diseases whose etiology is not well known and where it is not possible to implement prevention or screening	Senile dementia	111	1100
	Hyperparathyroidism	167	NA
	Ovarian cancer	56	17
	Paget's disease	56	530 (in X-rays)
	Lymphoma	56	67

NA: Not available

*The list of patients in the office: 1,800 people.

cancer, bladder cancer, prostatic hypertrophy, hypertension and genetic diseases), and five diseases whose etiology is not well known and where it is not possible to implement prevention or screening (senile dementia, hyperparathyroidism, ovarian cancer, Paget's disease and lymphoma).

Material and Methods

We collected data during the year 2014, in a family medicine office that has a list of 1,800 people over 14 years of age (in Spain family doctors attend patients over 14 years old) and who were treated continuously during the year for 15 new cases of selected diseases and were grouped into three blocks, following an epidemiological classification directed by medical intervention [11]:

a) Five diseases whose etiology is understood sufficiently for prevention (coronary heart disease, adverse drug reactions, pulmonary tuberculosis, stroke, traffic accidents),

b) Five diseases whose etiology is only partially known but for which there are proposed screening or prevention approaches (breast cancer, bladder cancer, prostatic hypertrophy, hypertension and genetic diseases), and

c) Five diseases whose etiology is not well known and where it is not possible to implement prevention or screening (senile dementia, hyperparathyroidism, ovarian cancer, Paget's disease and lymphoma).

The criteria for the inclusion of the 15 problems were mainly based on natural history, importance and feasibility of diagnosis [12]. These criteria were:

1. Health problems, both acute and chronic;

2. Common health problems;

3. Clinical significance (even if the problems are uncommon, such as genetic problems);

4. Health problems that do not submit to an insidious and asymptomatic beginnings which can hinder their diagnosis;

5. Problems which do not present a natural history with frequent remissions and relapses (such as depression, asthma ...) that could confuse the development rates of new cases;

6. Problems where it is clinically usual to consult a doctor (i.e., benign diseases were excluded, self-limited, they are usually self-treated);

7. A "reasonable" final number of health problems (theoretically can be studied as "all" diseases, but from the point of view of resources and possibilities of scientific presentation, it is reasonable to limit their number); and

8. Problems which have a clear and feasible diagnosis.

The medical office is in the health center of the neighborhood "Industrial Estate", Toledo, Spain, which has about 20,000 inhabitants that are a predominantly young population. The diagnoses were based in clinical and/or analytical results, or by additional relevant evidence from the consultation in family medicine or after consultation with a specialist or hospital [13]. Diagnostic criteria for the cases based on the International Classification of Health Problems in Primary Care, in its "Definite" version were used [14].

Incidence rates of each health problem in family medicine were calculated as follows:

Incidence rate in the office of family medicine = Incidence (new cases in one year) x list of patients (1,800 patients)/population (20,000) [15].

Results

Incidence rates for both sexes and for 1,000 people were found, in the targeted diseases, which ranged from 3.9 new cases per year in traffic accidents to 0.6 new cases per 1,000 people for pulmonary tuberculosis, genetic diseases, ovarian cancer, Paget's disease and lymphomas, respectively (Table 1).

Discussion

Continuity of care-the local environment of family medicine

The essence of family medicine is to assist individuals in families and communities and this implies, on the one hand a good continuity of care, and moreover a knowledge of the nature of diseases in the community. For the wise practice of family medicine, the traditional skills of diagnosis and treatment in individuals are not only necessary, but also the understanding of the frequency and distribution of disease in the community and their natural history [12].

So, we need a meeting or merger of epidemiology with family medicine. Populations are not just collections of individuals, but parts of local communities; and communities are part of a society. But, the common approaches to the patient [16] rarely look beyond

Turabian et al. Arch Fam Med Gen Pract 2016, 1(1):7-11

ISSN: 2578-6539 | • Page 8 •
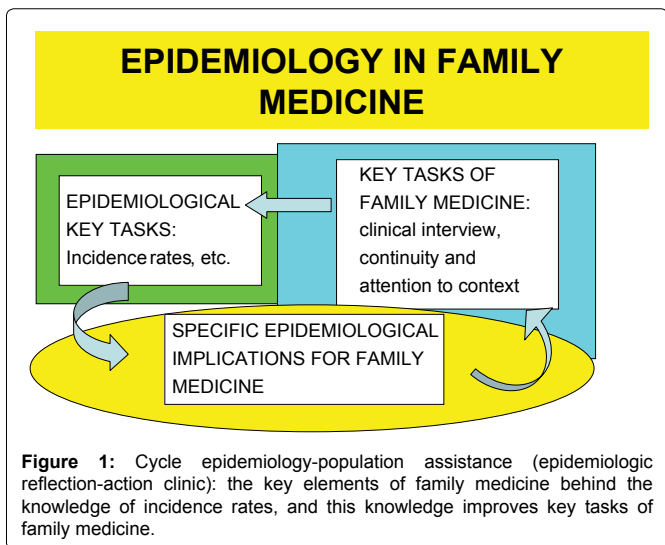
Figure 1: Cycle epidemiology-population assistance (epidemiologic reflection-action clinic): the key elements of family medicine behind the knowledge of incidence rates, and this knowledge improves key tasks of family medicine.

Table 2: Key concepts of family medicine involved in the knowledge of incidence rates at local level.

Key elements of family medicine	Elements required for calculating incidence rates
Clinical interview	Case
Continuity of care	New case
Attention to context	Denominator or population of the rates

him and his family, in order to address the community context and so, it fails to achieve a truly comprehensive view.

The three key elements of family medicine are the clinical interview, continuity of care and attention to context [17], and the study of incidence rates is involved in these elements for their calculation and for implementing interventions on the basis of the results. So, in family medicine, a cycle of "individual care-epidemiological or population care", "epidemiological vision-action and reflection at the level of family medicine consultation" which does not exist in other medical specialties occurs. The key elements of family medicine at the individual level are supporting knowledge of incidence rates at community level, and this knowledge can improve the key tasks of family medicine at individual or patient care level (Table 2 and Figure 1).

Family medicine presents a unique opportunity to study the natural history of disease and allows the establishment of patient-physician-family-community relationships [18]. Family doctor work includes the natural history of disease and the human life cycle, and so, no one is better able to observe, from family history, the ultimate consequences of any health problem. The simplest and most basic way to achieve effective care is by continuing care [19].

One of the advantages of continuity in family medicine is to know the incidence rates of disease. Hospital care is episodic, and its incidence data do not guarantee the accuracy by geographic area [20]. The accumulation of knowledge about disease and the ways in which people respond, can be seen in family medicine, but requires an effort of observation and good records. There is a tension between efforts designed in part to improve the ease of access to care and fostering the continuity in the relationship aspect of care [21].

Incidence of observed diseases during one year

We found rates of new cases per year in line with those reported (Table 2) [12,22-41], with the highest figure for traffic accidents for which there are no comparative figures that included injuries and trauma, and higher figures than reported for tuberculosis, pulmonary neoplasia, diseases of breast and bladder, hyperparathyroidism and genetic diseases (Paraparesia familial spastic), and lower

Table 3: Possible decisions or actions according to the local data of incidence rates of these 15 health problems.

Diseases	Incidence rates	Decisions or actions by health problem
Diseases whose etiology is understood sufficiently for prevention	Health problems with lower incidence rates relative to other places	Coronary heart disease and stroke: specific studies on this problem (diet, habits, stress, etc.) Adverse drug reactions: screening (opportunistic, systematic ...)
	Health problems with high incidence rates or with figures higher than those reported elsewhere	Traffic accidents: health education in the consultation, local media, school, workplace, etc. Pulmonary tuberculosis: specific training of professionals to handle this problem; specific studies
Diseases whose etiology is only partially known but for which there are proposed screening or prevention approaches	Health problems with lower incidence rates relative to other areas places	Hypertension: measures that include screening (opportunistic and systematic)
	Health problems with high incidence rates or with figures higher than those reported elsewhere	Breast cancer, Bladder cancer: specific training of professionals to handle this problem; specific studies Genetic diseases: collecting family history, genogram
Diseases whose etiology is not well known and where it is not possible to implement prevention or screening	Health problems with lower incidence rates relative to other places	Senile dementia: measures that include screening (opportunistic and systematic) in the medical consultation and the nursing visit at home, and family and caregiver interview Ovarian cancer: clinical interview and careful exploration; abdominal ultrasound in borderline cases Paget's disease: study measures include screening (serum calcium) both opportunistically and systematic, and careful clinical history collection
	Health problems with high incidence rates or with figures higher than those reported elsewhere	Hyperparathyroidism: possibly to include screening (serum calcium)

for hypertension, coronary heart disease, stroke, adverse drug reactions (collected only if clinically significant), senile dementia, ovarian cancer and Paget's disease. These local or contextual results have implications for prevention, screening and research, and for assessment of the burden of medical work and for the burden on the biopsychosocial health of the population.

Preventative care for the studied diseases

The impact of many diseases varies with age, so the age composition of the population attending the consultation will be a factor that will involve changes in the incidence. Similarly, the natural history of disease is a variable that changes the number of new cases of the disease in the consultation [12]. This natural history influences the biopsychosocial type of disease (acute, gradual, constant, recurring, non-fatal or fatal) [42].

Based on our results of "raw" incidence rates of these 15 health problems, the following decisions or interventions may be suggested (Table 3):

Table 4: Some specific epidemiological implications of family medicine related to the study of incidence rates.

Concepts of family medicine	Specific epidemiological implications
1. The great accessibility of patients	Access to the "numerator"
2. Continuity of care	Possibility of retrospective studies (case-control), prospective (cohort), clinical trials and single case studies
3. Working with a population geographical basis as "denominator"	Incidence rates can be known
4. Work with small geographical base	Possible misinterpretations of the incidence rates and its own epidemiological techniques to manage these sources of error
5. Individual care and community are not alternatives to the assistance given by the family doctor	What is traditionally called individual, family and community care (or contextual elements) are the same reality and cannot be separated

1. In health problems with low incidence rates relative to other places: it is suggested that the problem may be underdiagnosed in our practice and would be appropriate to include in screening measures (opportunistic or systematic);

2. Health problems with high rates of incidence and/or greater than those reported elsewhere, can be a significant problem in local areas and should have additional resources devoted to the problem: to teach local professionals, local specific studies, etc. Thus, this approach at local level, could have important general implications and its application in other local areas with a small geographical basis, like our study, could be indicated.

Limitations of our study

Among the limitations of our study, we can mention:

1. A potential bias in the use of continuous records because of information overload;

2. The familiarity between patient and doctor is a difficulty to realize in a new diagnostic;

3. The possibility of misdiagnosis, with either over or underdiagnosis [43], although we believe that, because of our methodology the error was minimized. The diseases recorded in general practice are generally valid with low numbers of false positive cases [13];

4. Random variation: the study was carried out in a single family medicine office, whose population base is small (1,800 people). In epidemiological analysis of small populations, it is advised to take a population base of 10,000 people [12] or study periods of time greater than a year, especially when diseases are studied with a low number of new cases [44]. Also, statistical methods have been proposed to avoid this problem [45]; and

5. Finally, another limitation of our study is that we showed rates "raw" i.e., rates referring to the whole population. Consequently, their interpretation, especially for comparison purposes should be made with caution because of the danger of erroneous conclusions. Accordingly, a first method to avoid errors of comparison would be to compare individually the rates for each age group. A second method to avoid erroneous comparisons for different age structures of the population would be to calculate "adjusted" rates by age. However, in our study with a small population base (1,800 people), the specific rates can increase random variation.

We propose the following to minimize possible misinterpretations when comparing incidence rates in individual consultations of family medicine:

a) Combine the information from incidence and prevalence rates;

b) Use periods of time longer than one year;

c) Study rates of incidence in more than one medicine office; and

d) Compare the results with those obtained in other family medicine offices that attend the same population.

In conclusion and summary

Knowledge of the local context by the family doctor, the great accessibility of patients to the family medicine office, and the fact that continuity of care characterizes family medicine have important epidemiological connotations, presenting a unique opportunity to study natural history of a disease and to know the incidence rates of diseases in small geographical bases, that would facilitate planning and proper use of resources [12,46]. There are specific implications for epidemiology in family medicine which have not been sufficiently systematized conceptually [47]. Table 4 presents some specific epidemiological implications for family medicine related to the study of incidence rates.

A main element of the family doctor and epidemiologist involves completion of the clinical individual picture (an "iceberg" of total diseases) in family medicine [39,40], and it is useful because it is an excellent way to evaluate the process and outcome of health care, simply by comparing the number of cases observed to be expected.

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Turabian et al. Arch Fam Med Gen Pract 2016, 1(1):7-11

ISSN: 2578-6539 | • Page 11 •