The Measurement of Drug Consumption

Drugs for Diabetes in Northern Ireland, Norway and Sweden


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Summary. The consumption of insulin and oral antidiabetic drugs was measured at the gross sales level in Sweden and Norway and at the prescription level in Northern Ireland. "Agreed daily doses" were used as units of comparison, which defined as follows: insulin 40 I.U., tolbutamide 1 g, acetohexamide 500 mg etc. Consumption was expressed as the number of "agreed daily doses" per 1,000 inhabitants per day. This provided a rough estimate of the number of subjects for whom the drug had been prescribed per 1,000 population. The data were collected during the three months April - June 1971. Marked differences in the consumption of antidiabetic drugs were found between the three countries and also between areas within each country. The consumption of insulin was similar in Norway and Northern Ireland (3.5 and 3.9 agreed daily doses per 1,000 inhabitants per day), but almost twice as high in Sweden. In Norway much lower use was found in certain rural areas. The variation in the consumption of oral antidiabetic drugs was even more marked. Surprisingly, consumption was considerably higher in Sweden (15.8) than in the nearby Norway (7.3), and was even lower in Northern Ireland (4.3). The major use was of sulphonylureas, especially chlorpropamide. Within the countries there was marked regional variation in the choice of individual biguanides and sulphonylureas. The data are discussed in relation to such factors as the incidence of diabetes, the sole use of dietary treatment etc. It is concluded that studies in depth, which link the actual use of drugs by patients to diagnosis, diabetic symptoms and clinical outcome of treatment are necessary in order to explore the reasons behind the marked geographical differences and to define a rational drug policy. However, the methods described in the study may be used for early detection of gross national differences in drug utilization, the further investigation of which may reveal to be of great public health interest.

Key words: Diabetes, insulin, sulphonylureas, biguanides, drug utilization, geographical differences.

The inappropriate use of drugs has become a matter of concern to public health authorities and drug regulatory agencies, as well as to individual doctors, pharmacists and patients. In 1969 the World Health Organization (WHO) sponsored a symposium on the consumption of drugs, at which information about drug usage (sales data and prescription figures) was presented from a number of European countries (1). No detailed comparison of the data could be made because their source and form varied in the different countries, but a considerable variation appeared to exist in national patterns of drug consumption.

The consumption of drugs can be studied as gross sales statistics available from drug manufacturers or national drug control agencies; from data available through prescriptions and pharmacies, and at the patient level, by interviews and by monitoring plasma drug levels. The present paper represents an initial attempt to obtain comparable data on the overall use of drugs per head of population in three different countries.

The study was conducted in Northern Ireland, where the cost analysis of prescriptions for National Health Service has been adapted to study the prescribing habits of the doctors in the area (2, 3, 4), and in Norway and Sweden, which also had facilities for such an investigation. Antidiabetic drugs were chosen for a methodological study. Of these drugs, insulin has well defined indications for use compared to the oral antidiabetic agents.
Material and Methods

An estimate of drug consumption was obtained by relating the amounts of drugs supplied to each country (each area) during the three months April, May and June 1971 to the numbers of inhabitants.

Sources of Information

In **Northern Ireland** each pharmacy sends all the National Health Service prescriptions to a central bureau for pricing and repayment at the end of each month. The three months' total for each area represents the amount of drug actually supplied on prescription to patients outside hospitals. Data on drugs supplied to hospitals was collected separately for the province as a whole and represented approximately 8 per cent of the total quantities prescribed.

In **Norway** all drugs are purchased by the state monopoly (Norsk Medisinaldepot) and are distributed by this organization to individual pharmacies, which in turn provide for both hospital and out-patient purchases. The pharmacies are maintained on a short-term stock refill basis, so that the records of three months' supplies to each pharmacy represents a good estimate of the amounts of drugs used to dispense prescriptions. The three month totals of drugs supplied to pharmacies in each geographical area has been taken to represent the consumption by that community.

In **Sweden** the total sales of drugs to pharmacies and hospitals are recorded by Läkemedelstatistik AB (Swedish Pharmaceutical Data LSAB). The sales statistics are published quarterly in the Swedish Drug Market and are made available for specific research purposes.

Drug Classification System

To ensure that the same drugs or therapeutic groups were investigated in the three countries the working party used the commercial classification of the European Pharmaceutical Market Research Association (EPhMRA) and the International Pharmaceutical Market Research Group. As used at present by the Norsk Medisinaldepot, this code includes two chemical subdivisions to permit identification of subgroups and single drugs (5). For example, phenformin is now coded A--10-B--01 standing for

A = Alimentary tract and metabolism
10= Antidiabetic therapy
B = Oral agent
A = Biguanide
01= Phenformin

Table 1. Agreed daily doses

<table>
<thead>
<tr>
<th>Drug</th>
<th>Daily dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulin</td>
<td>40 units</td>
</tr>
<tr>
<td>Phenformin</td>
<td>50 mg</td>
</tr>
<tr>
<td>Metformin</td>
<td>2.0 g</td>
</tr>
<tr>
<td>Acetohexamide</td>
<td>500 mg</td>
</tr>
<tr>
<td>Chlorpropamide</td>
<td>250 mg</td>
</tr>
<tr>
<td>Tolbutamide</td>
<td>1.0 g</td>
</tr>
<tr>
<td>Glibenclamide</td>
<td>5 mg</td>
</tr>
<tr>
<td>Carbutamide</td>
<td>750 mg</td>
</tr>
<tr>
<td>Glymidin</td>
<td>1.0 g</td>
</tr>
<tr>
<td>Tolazamide</td>
<td>250 mg</td>
</tr>
</tbody>
</table>

on a cost basis. Further, because of variations in dosage forms no comparison can be made between numbers of dispensing units (tablets, ml etc.) sold in the three countries.

The weight of active substance is a reasonable basic unit for comparison of the consumption of an individual drug, provided that gross differences do not exist in the bioavailability of different drug products. The consumption of groups of drugs, such as oral antidiabetic agents, can only be compared if allowance is made for potency. Tolbutamide is often used in a dose of 500 mg, but this has to be given 2 - 3 times per day, whereas chlorpropamide is used in a dose of 200 - 375 - (500) mg daily. To overcome this difficulty "agreed daily dose" units were established for each drug and were used both in comparing the consumption of that drug in different areas, and in comparing the consumption of groups of similar drugs. The agreed daily doses for the drugs have been listed in Table 1. The consumption has been expressed as the number of agreed daily doses per 1,000 inhabitants per day. This gives a rough estimate of the number of subjects for whom the drug has been prescribed per 1,000 population.

Geographical Areas

The division of each country into administrative or sales regions is indicated in Fig. 1, and their populations and characteristics have been listed in Table 2.

Results

Insulin

The consumption of insulin in Norway and Northern Ireland was about the same (3.5 and 3.9 agreed daily doses/1,000 inhabitants/day) and approxi-