

Longitudinal Study on the Consumption of Analgesics, Tranquilizers and Hypnotics by Healthy Swiss Men Over a 13-Year Period (1972–1985)

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Summary. This study describes the course of medical drug consumption (analgesics, tranquilizers, and hypnotics) in 843 identical, healthy men between the ages of 20 and 33 years. In 1972–1973, 4082 randomly selected 20-year-old Swiss military recruits were interviewed with a standardized questionnaire about parental drug consumption and their own consumption of tobacco, alcohol, analgesics, tranquilizers, hypnotics, and illegal drugs. In 1979, 1658 and, in 1985, 1554 men from the original sample were asked identical and similar questions via questionnaires sent by mail. The results presented concern the 843 men who took part in all three phases. The medical drugs these men consumed most often were analgesics. However, there was a significant decrease in the number of men who took these drugs either seldom or repeatedly during the observation period (28.6% vs 21.0%; $P < 0.001$). There was also a significant decrease in the proportion of men who used tranquilizers (8.7% vs 4.9%; $P < 0.01$); however, the proportions of men taking hypnotics were the same in 1972–1973 and in 1985 (5.4% vs 5.2%). In the study population, repeated consumption of analgesics and/or hypnotics and/or tranquilizers at the age of 20 significantly increased the probability that the subjects would habitually consume analgesics at the age of 33. Repeated parental consumption of hypnotics increased the probability that the sons would significantly increase their consumption of hypnotics and/or tranquilizers between the ages of 20 and 33. The results are discussed against the background of other findings concerning the epidemiology of drug consumption.

Key words: Medical drug-consumption habits – Longitudinal study – Early adulthood – Former military recruits – Questionnaire by mail – Healthy men

Introduction

The widespread consumption of analgesics, tranquilizers and hypnotics in industrialized countries has induced numerous investigations attempting to quantify the extent of drug use by means of sales statistics (Pommer et al. 1987; Williams et al. 1986), representative household surveys (Lecomte 1985), or cross-national studies (Balter et al. 1974). Other investigations have described the consumption of medicines in specified subgroups of the population, such as 19-year-old males (Sieber et al. 1985), students (Schmidt 1987), pharmacists and pharmacy students (McAuliffe et al. 1987), the working class (Bancarel et al. 1988), hospitals (Corrigan 1983; Portenoy and Kanner 1985), psychiatric outpatients (Battegay et al. 1983), and the elderly (Morgan 1983). Although some of these studies reflect drug use trends over time (Allgulander 1986; Battegay and Wacker 1983; Pommer et al. 1987; Sieber et al. 1985), they give no information about the development of medical drug use in the same individuals observed over a period of several years. Thus, to our knowledge there is a gap in our knowledge about the course of medical drug consumption over time in identical healthy individuals. Therefore, in 1972–1973, a prospective longitudinal study was started to investigate, among other things, the consumption of analgesics, tranquilizers and hypnotics by healthy 20-year-

old men. The rationale for the selection of these three types of medical drugs was the knowledge that they were widely used and that their use could induce drug dependency.

The study focuses on three topics:

1. A change in consumption of the aforementioned drugs between the age of 20 and 33 years.
2. Relationships between the drug-consumption pattern at the beginning and at the end of the observation period.
3. Impact of parental consumption habits on the drug-use pattern of the men studied.

Subjects and Methods

Questionnaires. In 1972–1973, 4082 randomly selected 20-year-old Swiss military recruits were interviewed with a standardized questionnaire about their consumption of tobacco, alcohol, analgesics, tranquilizers, hypnotics and illegal drugs (Battegay et al. 1975). In addition, standardized questions were asked about their sociodemographic characteristics, physical well being, physical complaints, general health, and parental consumption habits.

In 1979, a questionnaire with similar and identical questions was mailed to all former recruits who had filled in a questionnaire with an odd number in 1972. These men had indicated their matriculation number of the questionnaire at that time as well (Battegay et al. 1981). In this sample, 1658 men were sent questionnaires; 1103 (66.5%) returned them. In 1985, it was possible to trace the addresses of 1554 men; 1034 (66.5%) of them filled in the questionnaires and sent them back; 843 men took part in all three phases (Battegay et al. 1988). The results presented pertain to this sample and focus on the beginning and end of the observation period.

Statistics. For each phase the subjects' statements of their intake of the different medicines were summarized and outlined ("irregular," "repeated" or "daily") as opposed to "no consumption of medicines." The groups were compared by cross-tabulation and tested for significant differences with the chi-square test. Internal correlations were expressed with the phi-coefficient.

Results

1. The sample under study and the rest of the original population were compared. As can be seen in Table 1, our sample ($n_1 = 843$) differed from the rest of the original population with regard to the consumption of tobacco, illegal drugs and hypnotics in 1972–1973. In the sample followed up, there were significantly fewer men who consumed more than 9 g tobacco per day ($P < 0.001$), took illegal drugs more than 8 times within 5 years ($P < 0.001$), and/or consumed hypnotics ($P < 0.05$). Although there were significantly more men who had had more than 25 drunken episodes before

Table 1. Relative frequencies (percentage) of certain characteristics of men of the sample under study ($n_1 = 843$) compared to the rest of the original population in 1972–1973 ($n_2 = 3239$)

	Men followed up regularly	Rest of population	P
Alcohol consumption:			
More than 25 drunken episodes before recruitment	7.5%	9.8%	< 0.05
More than 160 g of 100% alcohol per week	25.9%	27.3%	NS
Tobacco consumption:			
More than 9 g tobacco/day	39.2%	46.0%	< 0.001
Consumption of illegal drugs: (cannabis, LSD, opiates, amphetamines)			
Consumed more than 8 times during the 5 years before first interview	6.0%	10.2%	< 0.001
Consumption of:			
– Analgesics	28.6%	32.1%	NS
– Hypnotics	5.4%	7.5%	< 0.05
– Tranquilizers	8.7%	9.7%	NS

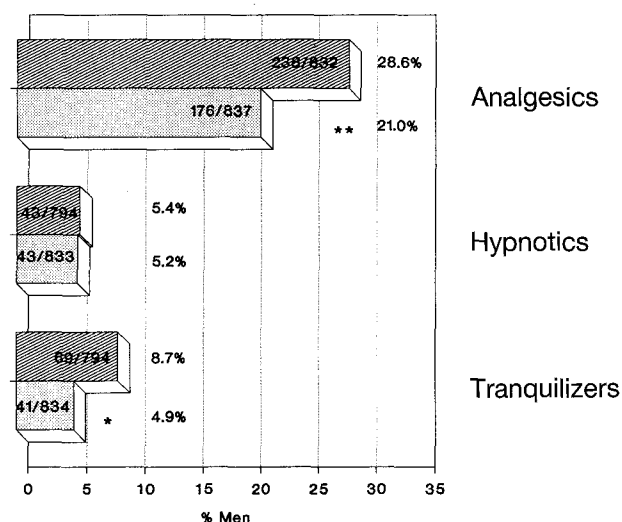


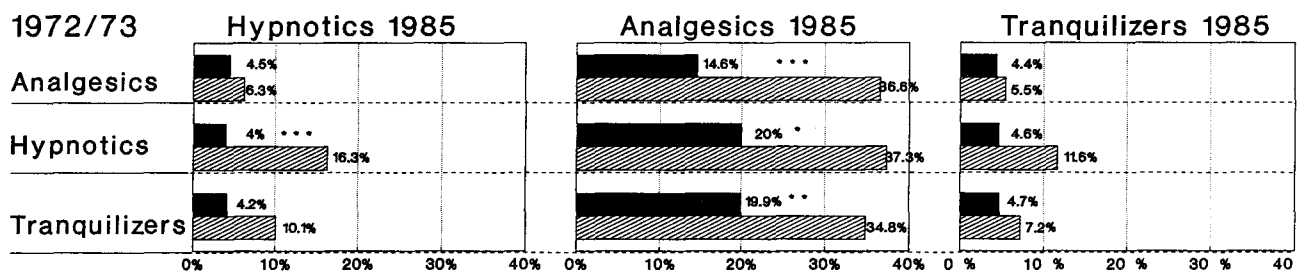
Fig. 1. Percentage of men who reported seldom taking drugs or repeated use in 1972–1973 and in 1985. Hatched bar (▨), 1972–1973; stippled bar (▩), 1985. * $P < 0.01$; ** $P < 0.001$

recruitment among the rest of the population ($P < 0.05$), there was no significant difference between the two groups with regard to alcohol consumption exceeding 160 g of 100% alcohol/week.

2. Cross-sectional examination of the relative frequencies of men taking medical drugs in 1972–1973 and/or in 1985 showed that the proportions of men consum-

Table 2. Medical drug intake by consumption group (1972–1973 to 1985)

Consumption group	Medical drug		
	Analgesics	Hypnotics	Tranquilizers
“Constant consumers” (consumers in 1972–1973 and in 1985)	10.5% (87)	0.9% (7)	0.6% (5)
“Discontinuers” (consumption 1972–1973; no consumption 1985)	18.3% (151)	4.6% (36)	8.2% (64)
“Beginners” (no consumption 1972–1973; consumption 1985)	10.4% (86)	3.8% (30)	4.3% (34)
“Non-consumers” in 1972–1973 and in 1985	60.8% (502)	90.7% (711)	86.9% (682)
Values missing in 1972–1973 or in 1985	(17)	(59)	(58)

**Fig. 2.** Percentage of men who reported repeated consumption of medical drugs in 1985 as opposed to their consumption level in 1972–1973. Solid bar (■), no consumption in 1972–1973; hatched bar (▨) repeated consumption in 1972–1973. * $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$ (chi-square)

ing analgesics and/or tranquilizers decreased significantly ($P < 0.001$, $P < 0.01$) between the beginning and end of the observation period. The proportions of men consuming hypnotics remained the same in 1972–1973 and in 1985 (Fig. 1).

3. The development of consumption habits from 1972–1973 to 1985 can be described by dividing the subjects into four groups for each type of medicine (Table 2): (1) subjects (Ss) who neither consumed medical drugs in 1972–1973 nor in 1985 were labelled “non-consumers”; (2) Ss who consumed the above medicines in 1972–1973 but did not do so in 1985 were called “discontinuers”; (3) Ss who did not consume one or more of these drugs in 1972–1973 but did so in 1985 were “beginners”; (4) Ss who consumed medical drugs at the beginning *and* at the end of the study were “constant consumers.”

There were about twice as many young men who stopped as there were subjects who had started to take analgesics or tranquilizers (Table 2). The longitudinal view thus confirms an overall decrease in the consumption of analgesics and tranquilizers. Obviously, the consumers of different medicines in 1972–1973 and in 1985 were not identical.

Figure 2 shows the proportions of men consuming medical drugs in 1985 in comparison with their medi-

cal drug intake in 1972–1973. Men who consumed analgesics, hypnotics, or tranquilizers repeatedly at the age of 20 were found significantly more often ($P < 0.001$, $P < 0.05$, $P < 0.01$) to take analgesics at the age of 33 than men who did not consume these drugs when recruits. There were also significantly more consumers of hypnotics among the men who took sleeping pills in 1972–1973 than among those who did not at the beginning of the observation period. There was no statistically significant relationship between the proportion of consumers of analgesics or tranquilizers in 1972–1973 and the consumers of hypnotics in 1985. No correlation could be found between the intake of tranquilizers in 1985 and the consumption of any of these drugs in 1972–1973.

To investigate the impact of parental medical drug-consumption on the consumption pattern of the sons, the sample was broken down into two groups: men whose parents consumed these drugs and men whose parents did not (Fig. 3). Irrespective of the parents' consumption habits, the sons' analgesics intake pattern in 1972–1973 correlated significantly with the pattern in 1985. The consumption of hypnotics in 1985 and in 1972–1973 correlated significantly for the men whose parents consumed analgesics or did not consume hypnotics. From 1972–1973 to 1985, the sons of parents who took hypnotics started to consume tranquiliz-

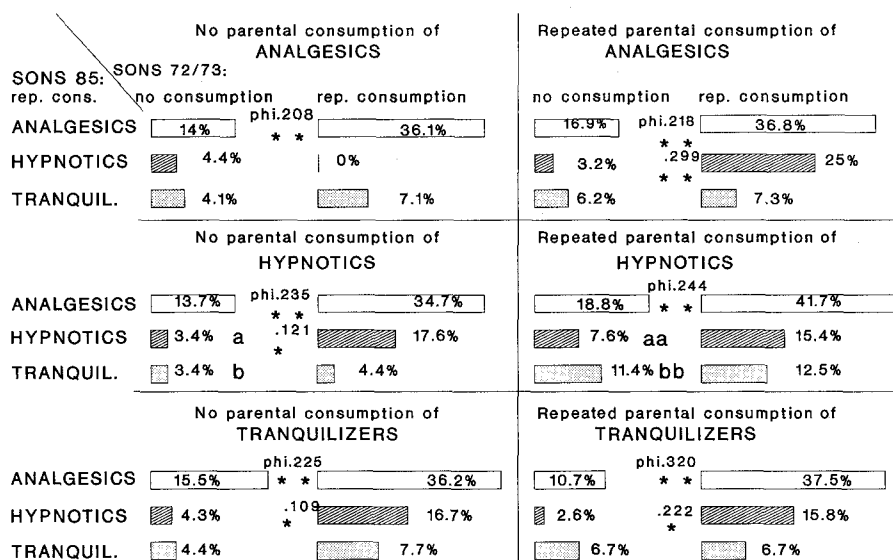


Fig. 3. Comparison of drug consumption in 1972–1973 with consumption of the same drugs in 1985 and with parents' consumption. * $P < 0.05$; ** $P < 0.001$. *a* vs *aa*: $P < 0.05$; *b* vs *bb*: $P < 0.001$

ers and/or hypnotics significantly more often than men whose parents did not.

Discussion

The results of this study should be interpreted with caution for several reasons:

1. The original study population was made up of 4082 men who were interviewed in 1972–1973 and were representative of healthy Swiss men (Battegay et al. 1975, 1981). The study sample in question consists of men who participated in all three phases of the survey ($n = 843$). The sample differs from the rest of the original population with regard to the consumption patterns of tobacco, illegal drugs, and hypnotics in 1972–1973 and with respect to the number of experienced drunken episodes at the age of 20. There is a significant underrepresentation of men who smoked moderately or heavily at the time of recruitment and who consumed hypnotics and/or took illegal drugs moderately at that time. However, there are no differences between the two groups of men in 1972–1973 with regard to moderate or heavy consumption of alcohol and with respect to the intake of analgesics and tranquilizers. These differences could mean that the sample of men studied may have been at less risk of developing medical drug misuse and abuse than the rest of the original population. Presumably then, in our sample these men could have been underrepresented who would have increased their intake of medical drugs during early adulthood. On the other hand, it should also be noted that among the “rest of the population” the proportion of men who consumed illegal drugs and/or hypnotics at the age of 20 is not overwhelming.

The prevailing majority (about 90%) neither consumed hypnotics nor took illegal drugs more than 8 times during the 5 years before recruitment. Thus, the extent of the “distortion” of the original sample should not be overemphasized. Bearing these considerations in mind, the subsequent aspects should also be taken into account.

2. The changes observed in the proportions of men taking medical drugs during the observation period could be the effect of a general change in attitude towards medical drug use between 1972 and 1985. However, this change could also be a specific attribute of the age period studied (early adulthood). Several authors made observations supporting the first explanation: Sieber et al. (1985) studied the development of consumption of medicines between 1971 and 1982 in three separate cross-sectional investigations in 19-year-old men. They found a reduction in the proportions of men with occasional and repeated intake of analgesics and hypnotics. This result supports the assumption that there was a general trend to decrease intake of analgesics and hypnotics between 1971 and 1982. It is of interest that in 1971 the proportion of their 19-year-old men who consumed analgesics and hypnotics was very similar to our results in 1972–1973. Pommer et al. (1987) point out that the total sales of all analgesics packages declined slightly in the FRG between 1976 and 1983. Allgulander (1986) describes a 34% reduction in benzodiazepine prescription in the United States between 1973 and 1983. Altogether, these findings indicate that during our observation period (1972–1985) the general trend towards a reduction in the use of analgesics, hypnotics and tranquilizers may have had an influence on the consumption habits of our subjects. On the other hand, it cannot be

excluded that a particular consumption pattern in men of the age period studied had an effect.

3. The terms “analgesics,” “tranquilizers,” and “hypnotics” do not allow differentiation between different chemical groups of medical drugs. In addition, we cannot estimate the extent of the use of medical drugs sold over the counter or the proportion of prescribed medical drugs. Above all, this concerns an estimation of the use of prescribed analgesics. It can be assumed that for the so-called tranquilizers, benzodiazepines, rank among the most commonly used drugs. The fact that these drugs are prescribed by physicians might partly explain the difference between the consumption of analgesics and tranquilizers. Other factors such as a higher rate of painful conditions or the easier availability of analgesics could also contribute to this difference. It is noteworthy that in 1985 every fifth 33-year-old man reported occasional or repeated intake of analgesics, whereas only every 20th subject consumed tranquilizers and/or hypnotics occasionally or repeatedly. Bonham and Leaverton (1979) report in their study that one-fourth of the adult population used aspirin once a week or more, while sleeping pills were used once a week or more by only 6% of the U.S. adult population. In the cross-national study on the extent of anti-anxiety/sedative drug use by Balter et al. (1974), it was found that the proportion of persons who use anti-anxiety/sedative drugs on 1 or more occasion varied from 17% in Belgium and France to 10% in Spain; the percentage of females who had used these drugs was approximately twice that of males.

As for the *development* of consumption habits of analgesics, tranquilizers and hypnotics over the observed period, the following statements can be made. Although the proportion of men who consume analgesics and tranquilizers has declined, it would be premature to conclude that there is a *uniform* trend to reduce the use of these drugs. A closer look at subjects who repeatedly consumed the different medical drugs in 1985 shows that a considerable proportion of men *increased* their intake of analgesics, hypnotics, and tranquilizers. These proportions are especially high for men with regard to the consumption of analgesics in 1985: from 14.6% to 20%. The corresponding proportions were comparatively low for men with regard to repeated consumption of hypnotics and/or tranquilizers in 1985. On the other hand, it should be stressed that of the men who repeatedly consumed analgesics, tranquilizers, and hypnotics in 1972, there was a significantly higher proportion of subjects who repeatedly took analgesics in 1985 than there were men who abstained from these drugs in 1972–1973. This means that there is a significant correlation between the consumption of analgesics, tranquilizers and hypnotics in 1972–

1973 and the intake of analgesics in 1985. This correlation illustrates the impact of the use of *different* medical drugs at the age of 20 on the consumption of analgesics at 33 years of age. In contrast to this finding, the consumption of hypnotics in 1985 correlates only with the consumption of the same medicines in 1972–1973, which hints at a possible fixed pattern of behavior with regard to the use of sleeping pills.

As for the impact of medical drug consumption by *parents* on the consumption pattern of their sons, four aspects are apparent:

1. Irrespective of parental habits, the sons' consumption of analgesics in 1972–1973 correlated with the consumption of the same medical drugs in 1985. These correlations, however, were stronger, if the parents had repeatedly consumed analgesics, hypnotics, and/or tranquilizers. This may reflect a certain impact of parental consumption of medical drugs on the use of analgesics by their sons in 1972–1973 and in 1985.
2. The lack of correlation between the consumption of hypnotics and/or tranquilizers in 1972–1973 and 1985 in men whose parents repeatedly consumed hypnotics can be explained by the fact that there are significantly more men in this group who started to consume hypnotics and tranquilizers between the ages of 20 and 33 than among men whose parents did not use hypnotics. Obviously, parental consumption of hypnotics had some impact on a small proportion of men who increased their intake of hypnotics and tranquilizers between the ages of 20 and 33.
3. In contrast to analgesic and hypnotic drug-consumption habits, no correlation was found between the use of tranquilizers at the beginning and end of the study. This lack of correlation means that the consumption of tranquilizers at the age of 20 and the drug-consumption pattern of the parents had no impact on the use of these drugs 13 years later.
4. Although these results hint that parental use of medical drugs has a certain impact on the intake of these drugs by their sons, it should be stressed that medical drug use at the age of 20 has a *higher* impact on the intake of medical drugs 13 years later than the parental consumption pattern.

Conclusions

Due to the study design, there was a slight “distortion” in the sample of men in this longitudinal investigation: men with a higher consumption pattern of tobacco, illegal drugs and hypnotics were underrepresented. Comparatively few men in this sample tended to increase their medical drug intake during the observa-

tion period. Thus, the following conclusions are valuable for 20-year-old healthy men who are at low risk of abusing or misusing medical drugs during early adulthood.

From the ages of 20 to 33 years the medical drugs they consumed most often were analgesics. Repeated intake of analgesics and tranquilizers was significantly reduced during early adulthood. This reduction may be the effect of a general trend in the population towards a reduction in the use of analgesics and tranquilizers during the observation period, but it could also be a peculiarity of the age group itself. Within the study population, repeated consumption of analgesics, hypnotics, and/or tranquilizers at the age of 20 significantly increased the probability that the subjects would repeatedly consume analgesics at the age of 33 years. If the parents repeatedly consumed hypnotics, the probability increased significantly that the sons would increase their consumption of hypnotics and tranquilizers between the ages of 20 and 33.

All in all, the consumption habits of these men at the age of 20 had a higher impact on their intake of medical drugs 13 years later than did the parental consumption pattern.

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