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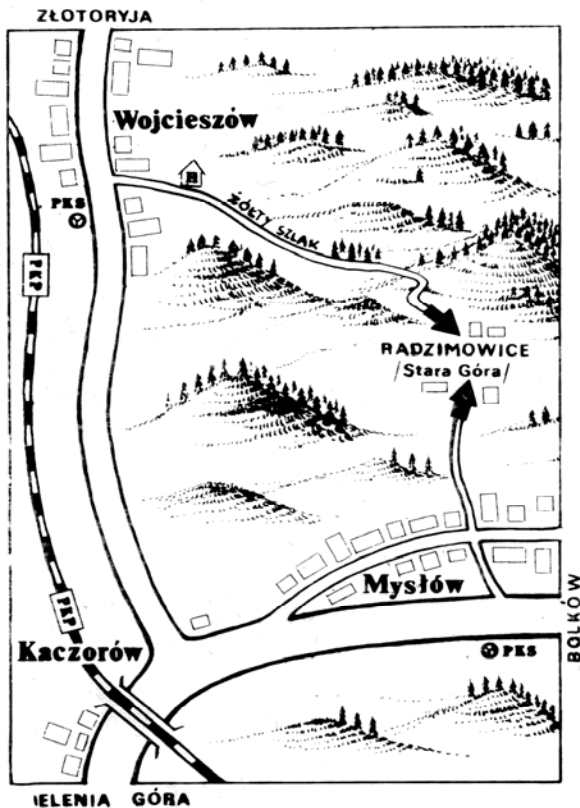
**STATISTICAL DESCRIPTION OF  
LIFE-TIME ALCOHOL CONSUMPTION  
BASED ON SURVEY DATA**

Alcohol use and abuse cause many negative consequences of the socio-economic nature, and estimation of their magnitude is an important matter from the social point of view. Information of the effects of alcohol abuse in a given population could be applied by state or local authorities for prevention as well as for protection of the victims of alcoholism.

Prevalence of the negative consequences of alcohol consumption is positively correlated with its level, so the heavy drinkers have the main share in the burden of costs and losses caused by alcohol drinking; therefore it is important to recognize the drinking patterns, as well as the factors influencing the level of drinking of that group of alcohol consumers during the consecutive stages of their growing alcohol addiction<sup>1</sup>.

The aggregate data concerning alcohol problems show, due to the systematic errors concerning the both sides of the problems, that is: consumption of alcohol and its consequences, numerous shortcomings, and do not give information about that special

group of alcohol consumers, so it was proposed to apply for the purpose of the research concerning lifetime alcohol consumption of heavy drinkers individual survey data. The data were gathered among the patients of Treatment Center for Alcoholics in Radzimowice. The respondents were asked to describe in detail, with professional help of the treatment center staff, possibly full history of their drinking, they were also asked to answer questions concerning some of their demographic characteristics.



<sup>1</sup> Population of "heavy drinkers" is broader than population of "alcohol addicts" – not every heavy drinker (but many of them) becomes addictive. On the other hand an "alcohol addict" is, as a rule, a "heavy drinker".

Radzimowice Treatment Center for Alcoholics is located in the south-west part of Poland, in a small village in the Kaczawskie mountains. The center consists of main building, where the patients live, “residents” house and a small farm.

The treatment center was assigned for the male alcoholics. The patients of the center usually undertook during their life several attempts to withdraw from the addiction in other treatment centers and did not succeed. The center staff has worked out their own, successful program of treatment and rehabilitation of alcohol addicts. During several years of their treatment practice they observed patients, who unsuccessfully, many times tried to overcome their addiction, and always came back to a treatment center. What they understood was that the patients, after their standard treatment, were not able after all to undertake normal life with all the daily problems, and that they had no faith in their own abilities to adjust to everyday life; therefore one of the main purposes of Radzimowice Treatment Center activities, apart from the therapeutic treatment, was to teach the patients how to lead self-dependent, sober life. After a year of treatment the patient could apply to be a “resident”. The status of “resident” was established to give home and support to the patients who finished the basic course of treatment, but were not fully ready yet to leave the center, or if they already left, they could come back anytime.

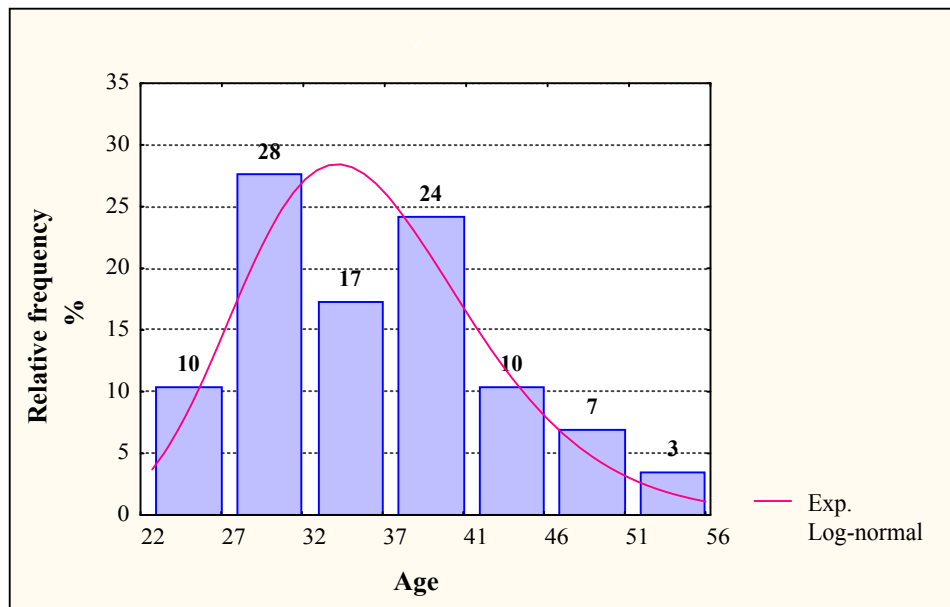
The construction of the applied questionnaire allows to describe the addiction history of each patient. One of the aims of the interviews was to help every patient to understand the developing process of his addiction as an effect of his previous drinking – at the end of the interview the patient was asked to draw a scheme of the process.

Statistical description of each patient’s life-time drinking helped them to understand their addiction history even better – they could also predict possible further development of this process.

On the basis of the description of the individual patients life-time drinking history some interesting information, concerning the whole group of that special kind of alcohol consumers, were obtained. The presented results are based on 29 interviews conducted in 1997. As the patients voluntary joined the treatment center (without any selection rule), the sample can be treated as a random one.

The age of questioned male patients of the treatment center ranged from 25 (the youngest respondent) to 52 (the oldest one), with the average age about 36.

The distribution of age of the respondents presents figure 1.



**Figure 1.** Distribution of age.

It can be noticed that the distribution is positively skewed, which means that in the sample predominate rather younger people, though the prevalence is not high<sup>2</sup>. About 75% of respondents belonged to the age class (25-40].

The most of the respondents (over 70%) had, at the moment of the survey, neither wife, nor girlfriend, but about 70% of them had children – nearly all respondents had regular contact with their children. About half of the respondents lived alone, about 40% with their families, the rest of them lived with other people.

Figure 2 presents respondents education level. It can be noticed that the most (75%) of the respondents had secondary or basic vocational education, only few (4) – primary and three of them graduated from a post-secondary school.

Before joining Radzimowice Treatment Center nearly 40% of the respondents were unemployed, and the next half of them worked only casually. Only three of the questioned patients had a regular job (figure 3).

<sup>2</sup> Asymmetry measure based on the third central moment ( $g$ ) was equal to 0.57.

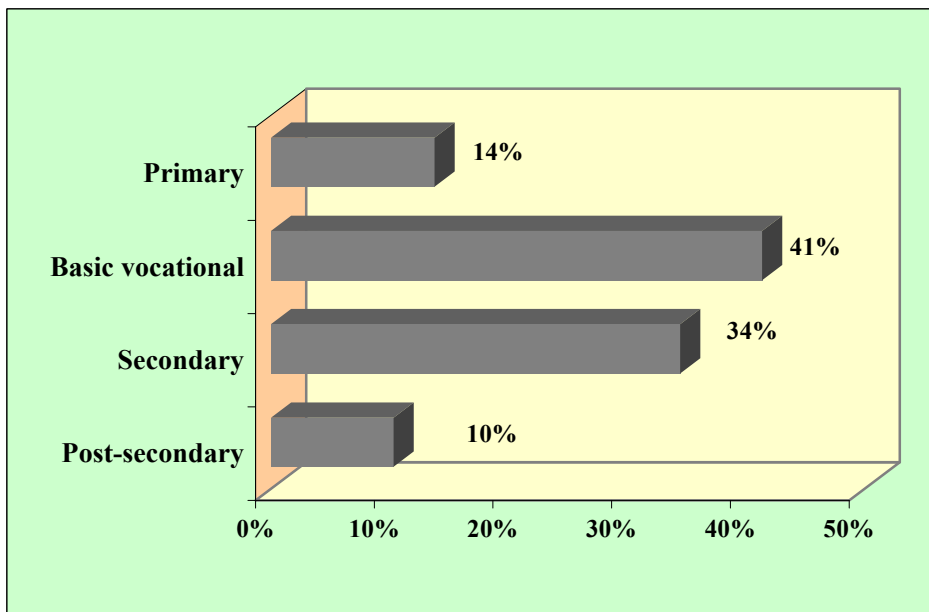


Figure 2. Education.

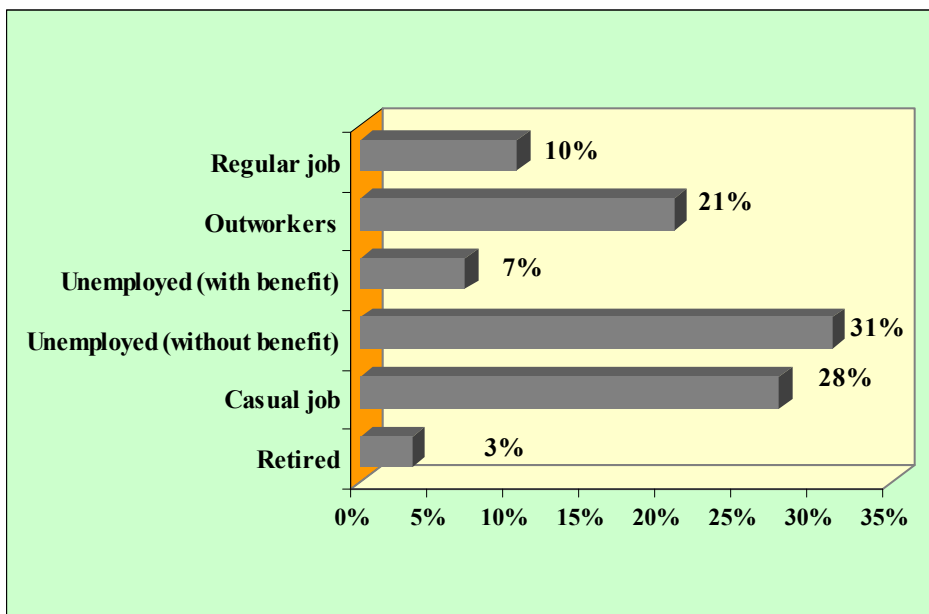


Figure 3. Labour status.

Most of the questioned patients (over 60%) lived, before joining the treatment center, in the urban area. Also over 60% of respondents declared themselves to be Catholics.

One of the main parts of the questionnaire concerns the patient's history of lifetime drinking, divided, for the purpose of getting more detailed description, into four stages:

- initial (drinking for pleasure, increasing tolerance to alcohol intake),
- warning (looking for drinking occasions, belief that alcohol improves frame of mind, gaps in memory, secret drinking),
- critical (family and work problems, aggressive behavior, irregular nourishment, slovenly appearance, morning drinking, qualms of conscience, feeling of emptiness and helplessness),
- chronic (binge drinking, drinking alone, morning drinking, degradation in the work place and in the family, taking away things from home, alcohol-related diseases).

The most of the respondents had their first contact with alcohol at the age 11-12, while the average age of beginning of alcohol dependency was 21.5 ( $\pm 5.7$ ). One of the respondents declared becoming addictive at the age of 14 (the lowest value), and one at the age of 37 (the highest value). Figure 4 presents distribution of age, at which respondents become alcohol dependent, according to their own declarations.

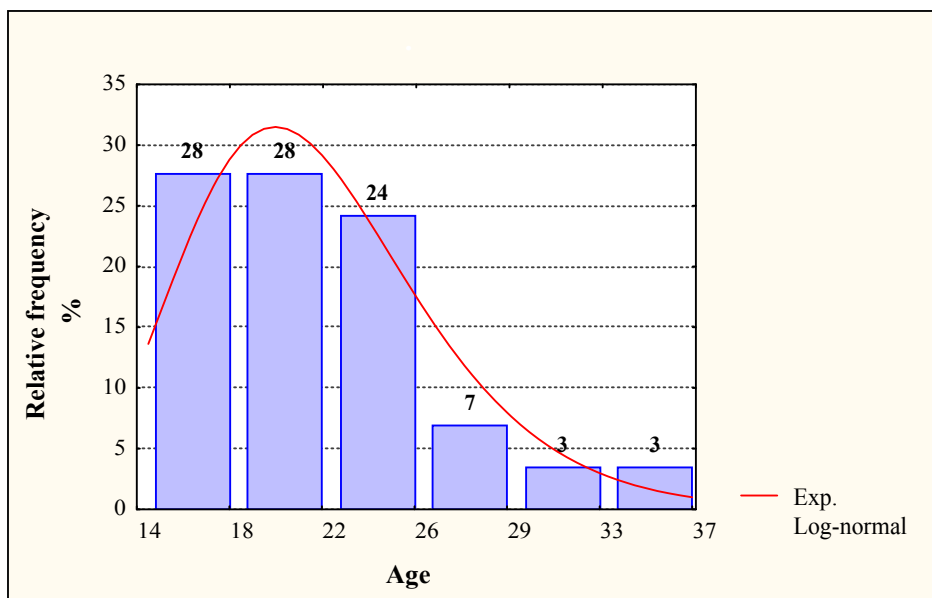


Figure 4. Distribution of initial age of dependency.

It can be noticed that the distribution is highly positively skewed ( $g = 1.4$ ), which means that the addictive behavior starts, as a rule, at the young age, the most often about 19.

It is interesting to notice that the age of beginning of alcohol addiction depends on the fact, whether in the family of the respondent were heavy alcohol drinkers, or not.

Figure 5 presents the differences in the average initial age of addiction between the subgroups of respondents divided according to drinking habits of their families. The median age of beginning of alcohol dependency was 19 years in the group of respondents, whose families included heavy drinkers, while the median age of dependency for the other group of respondents was 22; the difference between the subgroups is statistically significant ( $\alpha = 0.05$ ) according to Mann-Whitney's test.

The difference between the both above mentioned subpopulations concerning the initial age of alcohol dependency is even bigger if the mean values are considered (adequately 19.7 and 25.3 years).

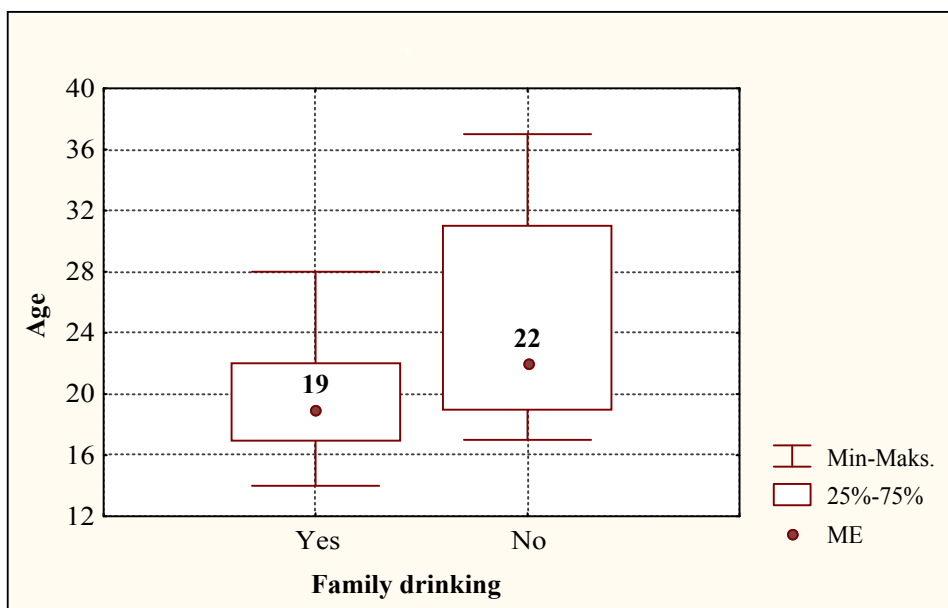
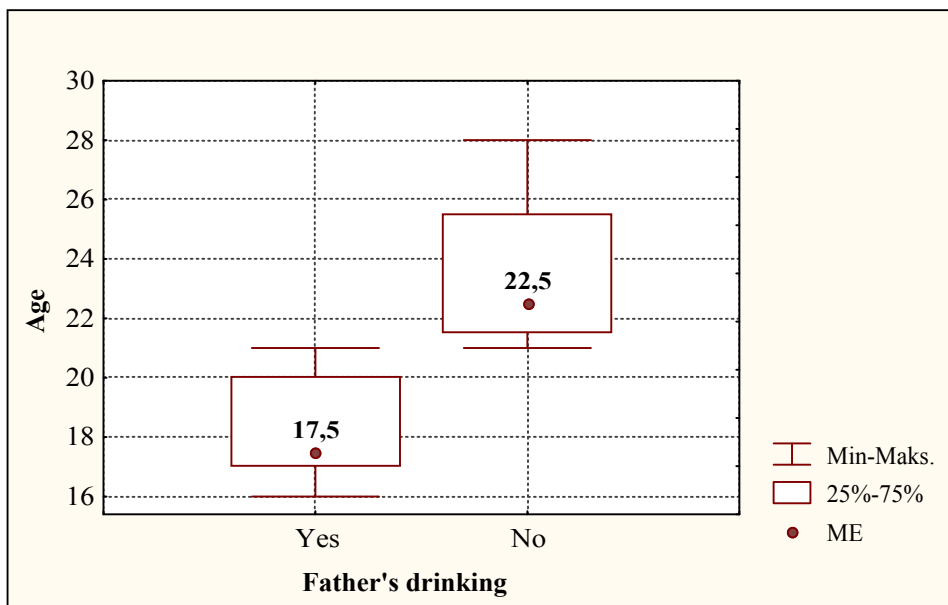


Figure 5. Initial age of dependency according to family drinking (ME denotes the median).

More detailed analysis indicates that the drinking habit of the father was of great importance (figure 6). It can be observed that the average initial age of the alcohol dependency was still lower for the respondents, whose father was a heavy drinker – in that group of respondents the median of initial age of dependency was 17.5, while the median age in the remaining group was 22.5 years. That difference is also statistically significant ( $\alpha= 0.05$ ), according to Mann-Whitney's test.



**Figure 6.** Initial age of dependency according to father's drinking (ME denotes the median).

In that context it is important to notice that the most of the questioned patients come from the families including heavy drinkers (about 70%), and in the most cases (nearly in the half of the whole sample) it was the father (figure 7).



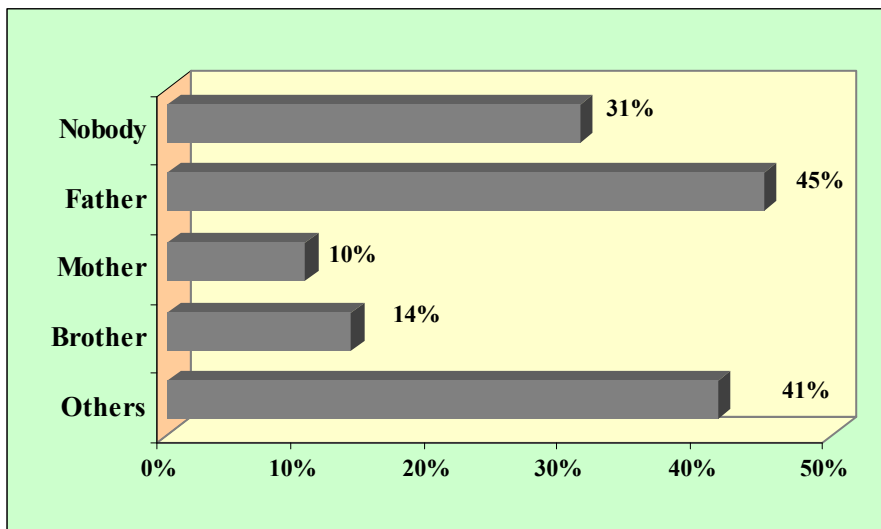


Figure 7. Heavy drinkers in respondent's surrounding.

The next question was: how long the respondents have been alcohol addicts till the moment of the survey? The average duration of addiction was 14.3 years, while the most often observed period of addiction was 10 to 15 years, with the mode 12.2 years.

The distribution of duration of alcohol addiction (in years) presents figure 8.

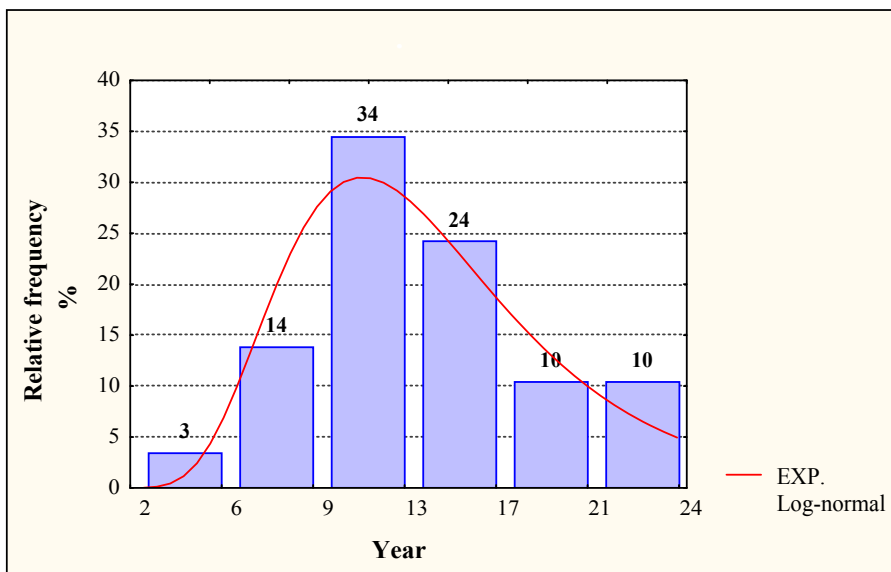


Figure 8. Distribution of duration of alcohol addiction.

In the next step Pearson’s coefficients of correlation were estimated between:

- respondent’s age and his initial age of addiction ( $r = 0.65$ ), which means that the older the respondent was, the later, as an average, he became an alcohol addict,
- respondent’s age and duration of his addiction till the moment of the survey ( $r = 0.63$ ), which means that the older the respondent was, the longer, as an average, was the period of his addiction,
- respondent’s initial age of addiction and duration of his addiction ( $r = -0.18$ , value statistically non-significant,  $\alpha = 0.05$ ).

The most of the respondents (over 85%) had during the last five years before they come to Treatment Center in Radzimowice less than 25 months of sober live. Figure 9 presents distribution of the length of the last, before joining the treatment center, non-drinking period of the patients. The observed regularity is well described by an exponential distribution, which means that the number of breaks in alcohol heavy drinking is declining fast as the breaks became longer.

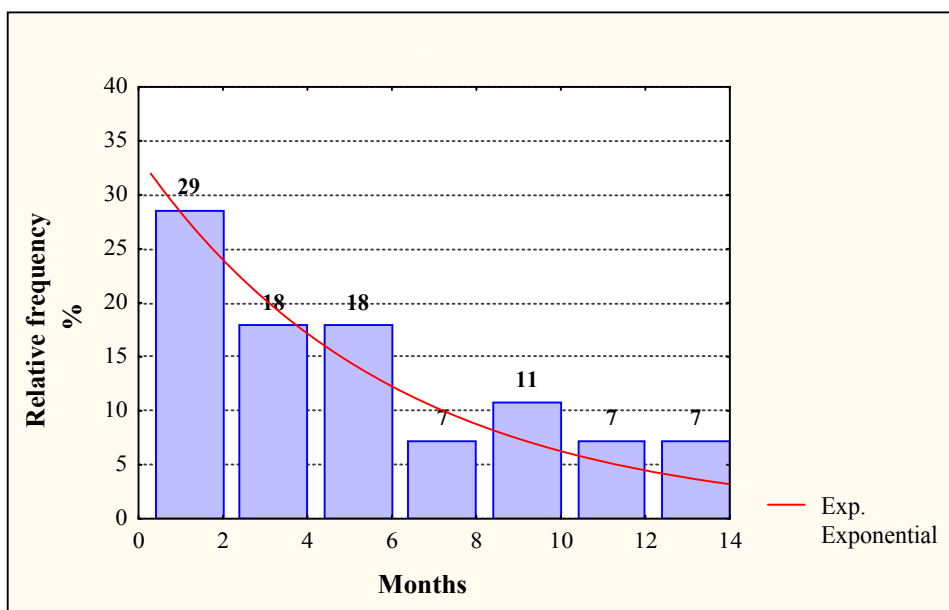
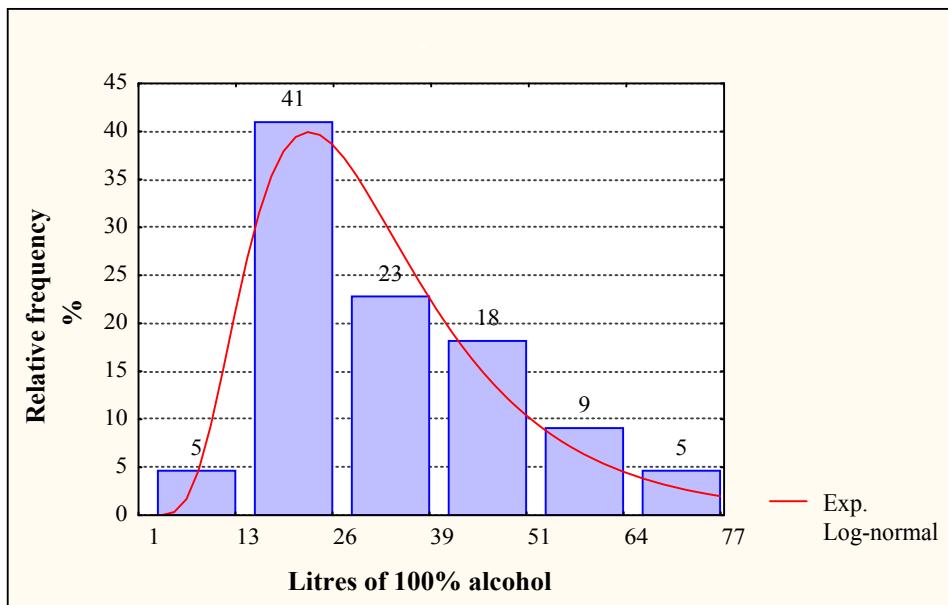


Figure 9. Distribution of duration of actual no-drinking period.

Figure 10 presents distribution of the average, annual reported alcohol consumption (litres of 100% alcohol). It can be noticed that the distribution is positively skewed, and its shape corresponds with the shape of the lognormal

curve – the theoretical curve often used in the population surveys for description of distribution of alcohol consumption.



**Figure 10.** Distribution of the reported alcohol consumption.

It is interesting to notice that the lognormal curve seems to fit<sup>3</sup> also to the survey distribution of alcohol consumption of that very specific group of consumers.

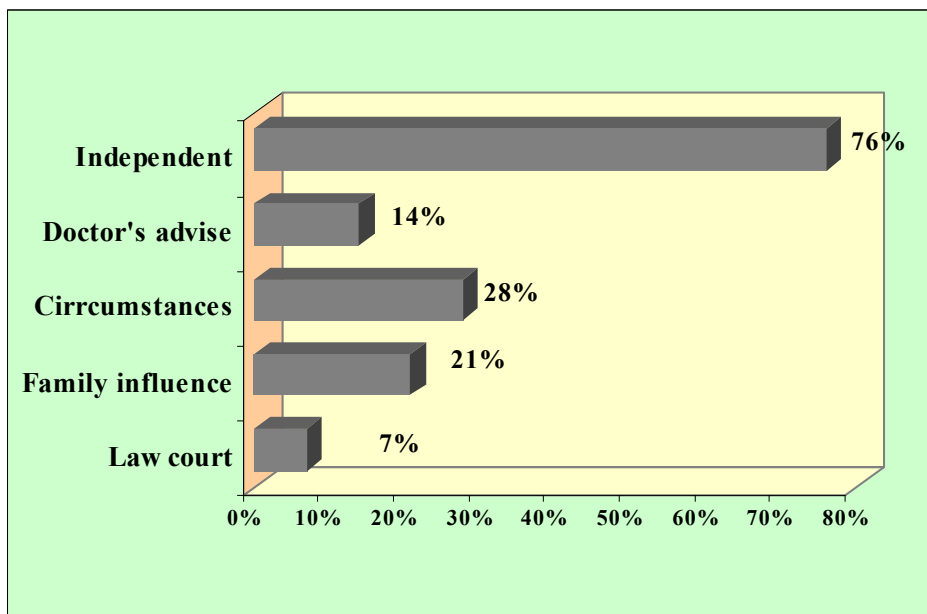
The yearly, average alcohol consumption of the respondents during the period of their alcohol abuse was 44.9 litres of 100% alcohol. They usually consumed yearly about 46 l of spirits, 100 l of wine and 96 l of beer, which means that spirits constituted about 52.3% of average yearly alcohol consumption, wine about 35.4% and beer – 12.3%. Few of the respondents declared additionally consumption of some methylated spirits or moonshine.

The respondents were also asked to estimate the value of their expenditure on alcohol during the years of their heavy drinking, and at the end of that set of

<sup>3</sup> To apply a statistical test to verify the goodness of fit of the lognormal distribution to empirical data, observations have to be divided into several classes. In this case the number of available observations occurred to be too small for that purpose.

questions they were supposed to write their conclusions and feelings. Nearly all of the respondents were astonished of the magnitude of the volume of alcohol they drunk and of its high value. Some of them begun to wonder, what could they have bought for the money they had spent on alcohol.

Finally, the respondents decided to undertake a treatment. For the most of them (figure 11) it was their independent decision, in some cases the decision was influenced by the family or doctor's advise, in some cases it was decision of a law court.



**Figure 11.** Decision of treatment.

As it has already been mentioned, the most of Radzimowice Treatment Center patients tried to overcome their addiction many times, as alcoholic clinics' in- and outside patients. As an average they stayed previously 3.3 times in a clinic (one person 17 times), and meanly 2.4 times as outside patients (the highest value – 8 times); the average annual number of days they used “Anticol” before they joined the Radzimowice Center was about 86.3.

As an illustration of the above characteristics of the respondents, lifetime drinking history of one patient will be described in detail.

At the moment of the survey the patient was 38 years old, divorced, had one 14-year-old child, but he had no contact with the child. He finished a secondary school, came from a big city, before joining the Radzimowice Center he had no regular job. His grandfather was heavy drinker. He has considered himself an alcohol addict since the age of 17, so at the moment of survey he has been an alcoholic for 21 years. History of his drinking presents figure 12.

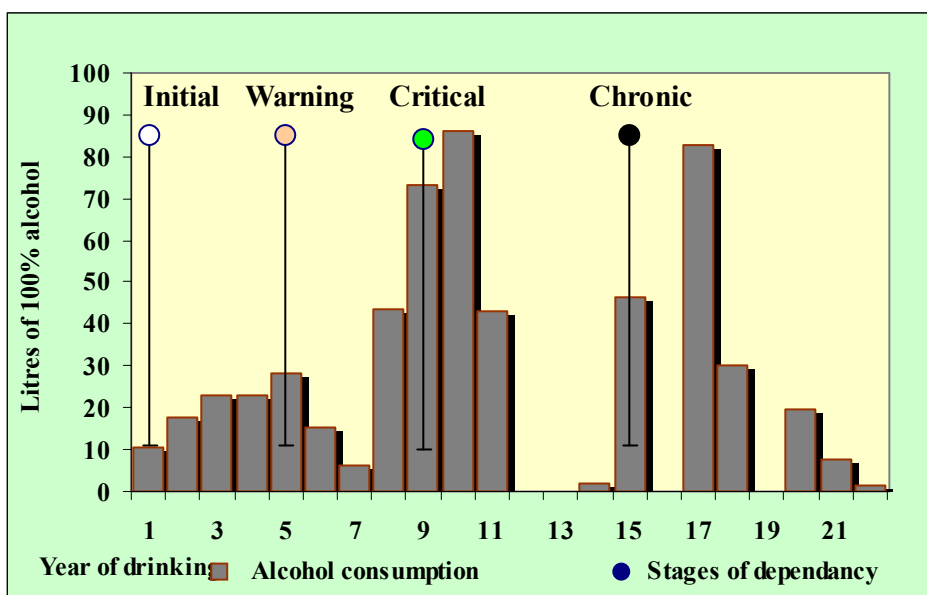


Figure 12. Drinking history of the patient.

During 18 years of his heavy drinking (he had three one-year long breaks) he consumed as average in a year: about 41 l of spirits, 21 l of wine, 304 l of beer, and 0.6 l of moonshine, so the beverage specific structure of his average, yearly consumption was: 51.8% spirits, 8.1% wine, 38.4% beer and 1.7% – moonshine. His annual, average, reported consumption calculated in pure alcohol was about 31.6 l.

Figure 13 presents relation between the respondent's annual reported drinking (litres of 100% alcohol) and number of days in a year, when he considered himself as being drunk.

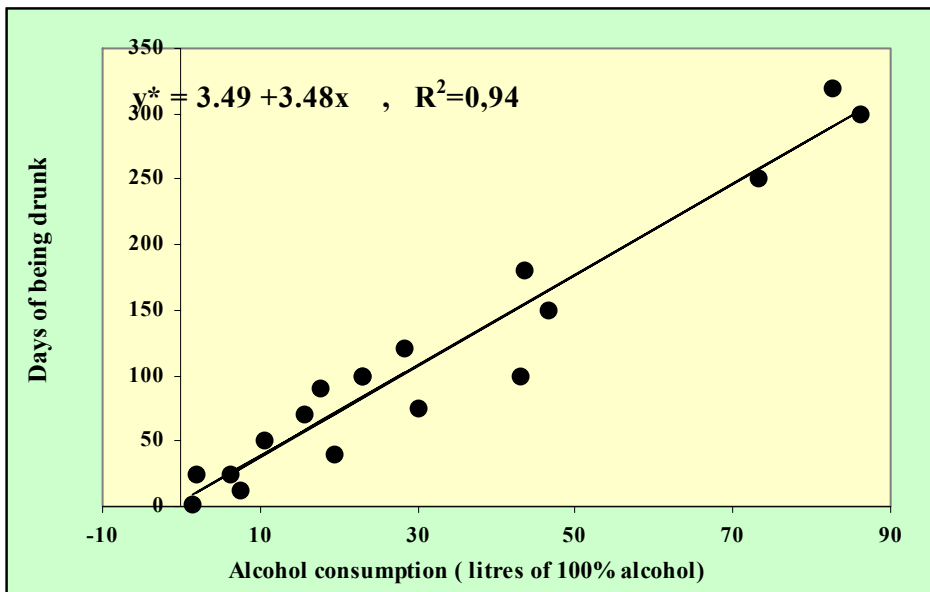


Figure 13. Patient's drinking and his “being drunk” days.

Between annual, reported drinking ( $X$ ) and number of the patient “being drunk” days in a year ( $Y$ ), a linear relation can be observed, and following regression model can be estimated:

$$y^* = 3.49 + 3.48x, \quad R^2 = 0.9380, \quad DW = 2.13 \quad /1/$$

(16.06)

where:  $R^2$  denotes coefficient of determination,  $DW$  – Durbin-Watson statistics, number in brackets – value of  $t$ -statistic.

The results indicate that the increase of the patient’s annual drinking by 1 litre of pure alcohol increases number of his “being drunk” days, as an average, by 3.48.

The next figure (14) shows the above relation in time, i.e. during 21 years of the patient’s heavy drinking. The last, 22<sup>nd</sup> year, was the first year of his treatment in the Radzimowice Center.

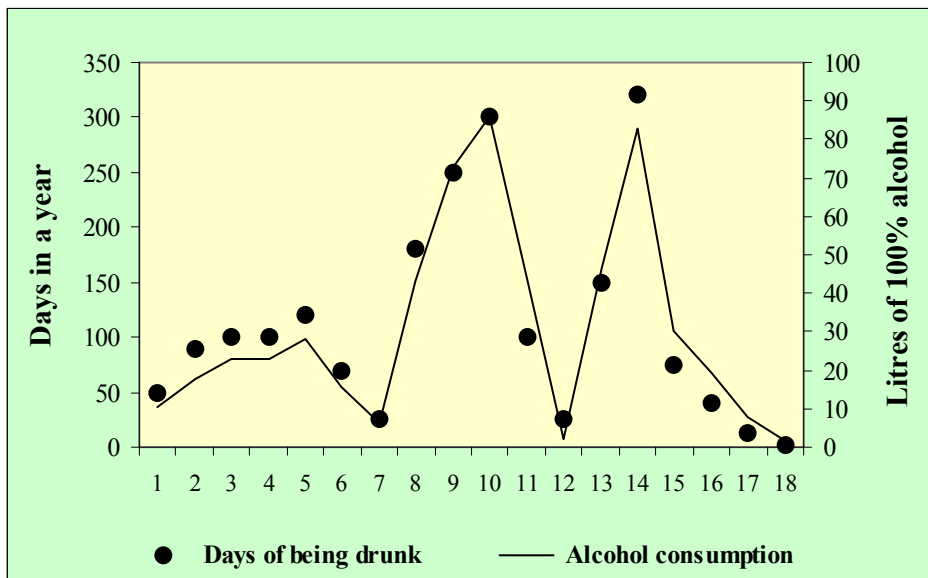


Figure 14. Patient's drinking and his "being drunk" days during years of heavy drinking

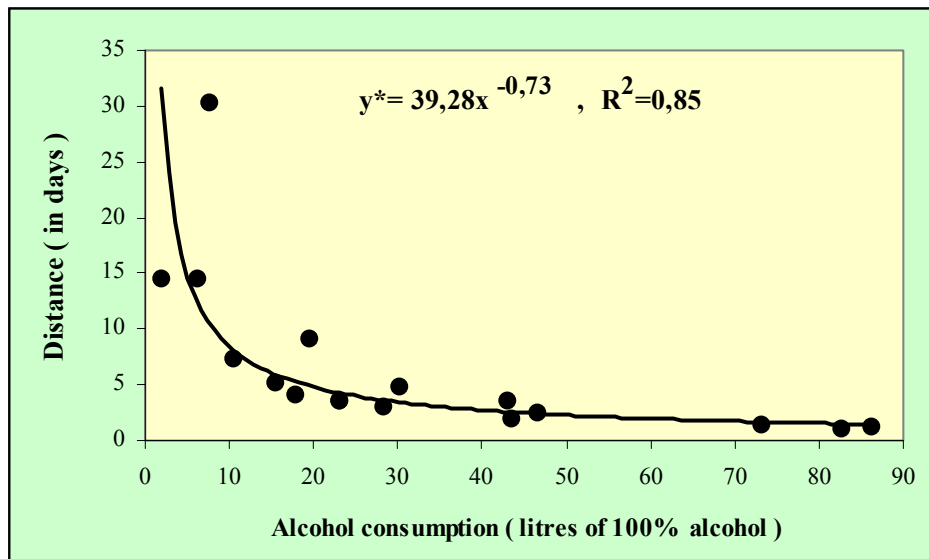
As the patient estimated himself, his added “being drunk” days constituted together, during 21 years of his heavy drinking, 4 years and 7 months. He found the result of this estimation horrifying.

Regression model /2/, illustrated by figure 15, describes<sup>4</sup> connection of annual, reported drinking ( $X$ ) of the patient and the distance between his “being drunk” days ( $Y$ ).

$$y^* = 39.28 x^{-0.73} \quad R^2=0.8463 \quad DW = 1.80 \quad /2/$$

(-8.78)

<sup>4</sup> The goodness of fit measures of the regression model /2/ refer to its linear transformation.



**Figure 15.** Patient's drinking and distance between his "being drunk" days.

The results can be interpreted as follows: an increase of the patient's average, annual alcohol consumption by 1% decreases the distance between his "being drunk" days approximately by 0.73%.

The patient undertook several attempts to stop drinking:

- 3 times he was a patient of a clinic for the alcoholics,
- 8 times he was an outdoor patient,
- he took "Esperal" 3 times,
- he took "Anticol" 18 times.

Finally, he became patient of Treatment Center in Radzimowice. At the end of the questionnaire he wrote that the most painful for him was that for such a long time he was not able to realize, how much alcohol he had drunk during his life, and what destruction in his and in his family life caused his alcohol drinking.

The results of reviewing the lifetime alcohol drinking history of the patients of Radzimowice Treatment Center allow to draw several conclusions:

1. At special risk of developing alcohol addiction are very young people (since the age of 11-12), coming from families with alcohol drinking habit; the risk is especially high, if the father is heavy drinker.



2. The above remark might be an indicator for the proper authorities concerning allocation of professional preventive help, which, given in the proper time, might prevent these young people from alcohol addiction, and simultaneously, may save a lot of costs and losses to the society.

3. For the most of the patients the survey was the first occasion to square up with their life-time alcohol drinking and, according to the treatment center staff opinion, this confrontation had highly positive influence on the treatment process, so the survey questionnaire had been applied in the Radzimowice Center as a standard treatment device.

4. The presented simple statistical analysis gives additionally interesting information and indicators concerning the process of getting alcohol dependent and coming out of the dependency; the statistical description of lifetime alcohol consumption, especially with regard to every patient, helps the patients to understand the process which led them to the stage of alcohol dependency.

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Source of all figures: authors' own calculation.