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ORIGINAL PAPERS: CLINICAL OR BASIC RESEARCH

# Why do people smoke?
## *The case of persons with type 2 diabetes*

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*ABSTRACT*

***Objectives.*** *This study examined the psychosocial factors related to smoking attitudes and behavior in people with type 2 diabetes (T2DM).*

***Materials and methods.*** *The studied sample consisted of 72 persons with type 2 diabetes from the Clinical Center of Diabetes, Cluj-Napoca. We elaborated a self-administered 17-items questionnaire, concerning smoking habits, control smoking behaviors, the knowledge level and the source of information about the smoking consequences.*

***Results.*** *The participants have an high smoking addiction levels, as measured by an decreased control over smoking, lighting up the first cigarettes shortly after awakening, smoking when sick or forbidden. The higher the addiction severity, the greater the number of cigarettes smoked daily, independently of demographic or clinical characteristics. Smoking has the perceived benefits of reducing the burden of negative emotions and facilitating socialization. The knowledge level on smoking consequences over diabetes progression and management is surprisingly low and the contribution of health care team on smoking cessation is perceived as insufficient.*

***Conclusions.*** *The main psychological contributors on continuing smoking are the perceived smoking benefits on reducing negative emotional states. The medical status and the presence of associated conditions do not change the smoking pattern in the studied sample of people with T2DM. The present findings underline the necessity of identifying the attitudinal and behavioral components of smoking prior any smoking cessation intervention program in people with diabetes. The results sustain the importance of including the smoking status as "vital sign" in the routine consultation in order to enhance the physician's time and resources spent with smokers with diabetes.*

**Key words:** type 2 diabetes mellitus, smoking-related psychosocial factors.

## INTRODUCTION

Smoking is often described as been "the leading *avoidable* cause of mortality and one of the most important *modifiable* causes of premature death" (1,2). Despite the knowledge of the health consequences of cigarette smoking, a tremendous high number of people continue to smoke worldwide. Prevalence of smoking among people with diabetes is similar to that in persons without diabetes (23.2% as documented in US population in 2001) (3). Substantial health benefits are achieved subsequently to smoking cessation, in terms of reducing the risk for coronary heart events or mortality (4-6).

The main factor threatening the success of smoking cessation efforts is a quantitative and qualitative subjective comparison between the smoking advantages and disadvantages. The advantages of smoking are immediate and true whereas the disadvantages are delayed and probable. The smoking has a real compensatory and rewarding function. The positive consequences of smoking include reduced irritability, induced relaxation, increased sense of control,

sensorial stimulation (smell, sight, taste, and touch), maintain group affiliation etc. The long-term benefit of quitting smoking cannot be guaranteed and smokers are constantly confronted with cases of people who are free from smoking-related diseases after years of heavy smoking.

A better understanding of the factors that maintain smoking behavior and factors that promote smoking cessation would be of substantial health benefit for people with diabetes. Our intention was to evaluate the smoking habits and to identify the psychosocial factors related to smoking status in people with type 2 diabetes attending an outpatient clinic in Cluj-Napoca, Romania. ❑

## MATERIALS AND METHODS

### Subjects

Our study was conducted in the Clinical Center of Diabetes, Nutrition and Metabolic Diseases, Cluj-Napoca, Romania. We selected a convenience sample of 72 smokers with type 2 diabetes mellitus (T2DM) attending in succession the outpatient clinic in a 2-months period. All participants were informed about the purpose of the study and their verbal consent was obtained prior to testing and processing the data from medical records. Medical records were used to collect personal, clinical and laboratory data. The duration of T2DM was at least 3 months and the treatment included oral medication and/or insulin. Only persons on diet were excluded.

### Evaluation of smoking

We constructed a questionnaire of 17 items concerning the attitudes and behaviors related to smoking. The variables assessed included the smoking-related personal characteristics (age at the start of smoking, duration of smoking, number of cessation attempts, the duration of smoking-free periods), the smoking habits (number of daily consumed cigarettes, smoking-related activities and situations), the reasons and beliefs regarding smoking, the craving and control smoking behaviors, the knowledge level and source of information about the smoking consequences, the desire to quit, the number and duration of quitting attempts. Each of the smoking-related behaviors was converted into specific quantitative measures, using a 4-point Lickert scale (ranging from *never* to *always*) or assigning 0 or 1 point for the absence/presence of a specific behavior (for example, smoking when sick or forbidden has been assigned with 1 point, while not smoking in these conditions received 0 points etc).

An increased level of addiction was considered when the following conditions were present in a higher extent: early lighting up, more cigarettes being smoked in the morning, decreased control over smoking, neglecting responsibilities due to smoking, smoking when sick or forbidden and withdrawal symptoms being relieved after recommencing smoking. We calculated a total addiction score based on summing all the partial scores (minimum = 4 points; maximum = 18 points).

We pretested the questionnaire and we modified it accordingly to the suggestions of 7 members of health care team and 10 smokers with type 2 diabetes. The final form was used for all 72 persons. The patients filled the questionnaires, while waiting for the regular visit with their physician. The time required for questionnaire completion was about 10 minutes, on the average.

### Statistical analysis

Results are given as means ± SD or as percentages. Group comparisons were computed using parametric (Pearson's t-test) or non-parametric ($\chi^2$) methods. The relationships between variables were calculated by the correlation coefficients r, Spearman's rho or Kendall's tau. Results with $p<0.05$ were considered significant. ❑

## RESULTS

Demographic, clinical, laboratory characteristics and gender differences of the studied sample are shown in table 1. There are no differences between women and men with diabetes on their demographic, clinical and laboratory characteristics. The only exception concerns the smoking-related issues, men having started smoking at an earlier age ($t=3.67$,

| Characteristic | Men (N=54) | Women (N=18) | p value |
|---|---|---|---|
| Age (years) | 52.8±9.4 | 53.6±7 | 0.74 |
| Education (years) | 10±3 | 11±3 | 0.62 |
| Smoking starting age (years) | 20.7±6.8 | 27.5±5.8 | <0.0001 |
| Years of smoking | 30.2±11.3 | 24.7±7 | 0.06 |
| No. of cigarettes/day | 16.1±8.6 | 11.8±5 | 0.049 |
| BMI (kg/m$^2$) | 29.50 | 29.61 | 0.93 |
| SBP (mmHg) | 133.26±18.23 | 144.00±22.06 | 0.06 |
| DBP (mmHg) | 87.60±16.19 | 82.17±10.99 | 0.14 |
| Cholesterol (mg/dl) | 200.36±45.93 | 207.61±38.79 | 0.55 |
| Triglycerides (mg/dl) | 236.34±158 | 172.67±86.88 | 0.31 |
| HDL-Cholesterol (mg/dl) | 41.89±11.51 | 45.40±15.47 | 0.37 |

**TABLE 1.** Gender differences in personal data of the subjects

Data represent mean ± SD. BMI-body mass index, SBP-systolic blood pressure, DBP-diastolic blood pressure

p=0.0001) and smoked more cigarettes daily (t=2.00, p<0.05). The majority (61%) of women with T2DM smoke less than a half of a pack of cigarettes daily; meanwhile 50% of men with T2DM smoke more the one pack of cigarettes daily. The laboratory data show a poor metabolic control in the studied sample of persons with T2DM, average values of serum lipids and blood pressure being above recommended limits.

## The smoking pattern in people with type 2 diabetes

The smoking pattern in people with type 2 diabetes revealed similar characteristics for men and women as shown in Figure 1. A decreased control over smoking is perceived by the great majority of participants (more than 94% of all subjects). Interestingly, smokers with T2DM tend to overestimate their capacity to control the smoking behavior. When the item "How often do you smoke more than you want to?" (the rate of response shown in the first group of columns) was transformed into "How often do you feel you cannot control smoking?" (the rate of response shown in the third group of columns), more than one third of people that initially declared that smoke more that wanted, didn't recognized such loss of control.

Another addiction component – the tendency to smoke rather in the mornings – has been highly represented in this sample of persons with diabetes ($\chi^2$ = 4.44, p<0.035): more than half of men and more than two thirds of women declared that morning is the period with the highest cigarettes consumption. In addition, over two thirds of subjects have their first cigarette within the first hour after awakening and, as many as 20% of them light up in the first 5 minutes! Comparing with women, men with T2DM are more prone to smoke even when smoking is forbidden, when they are sick and to neglect their responsibilities

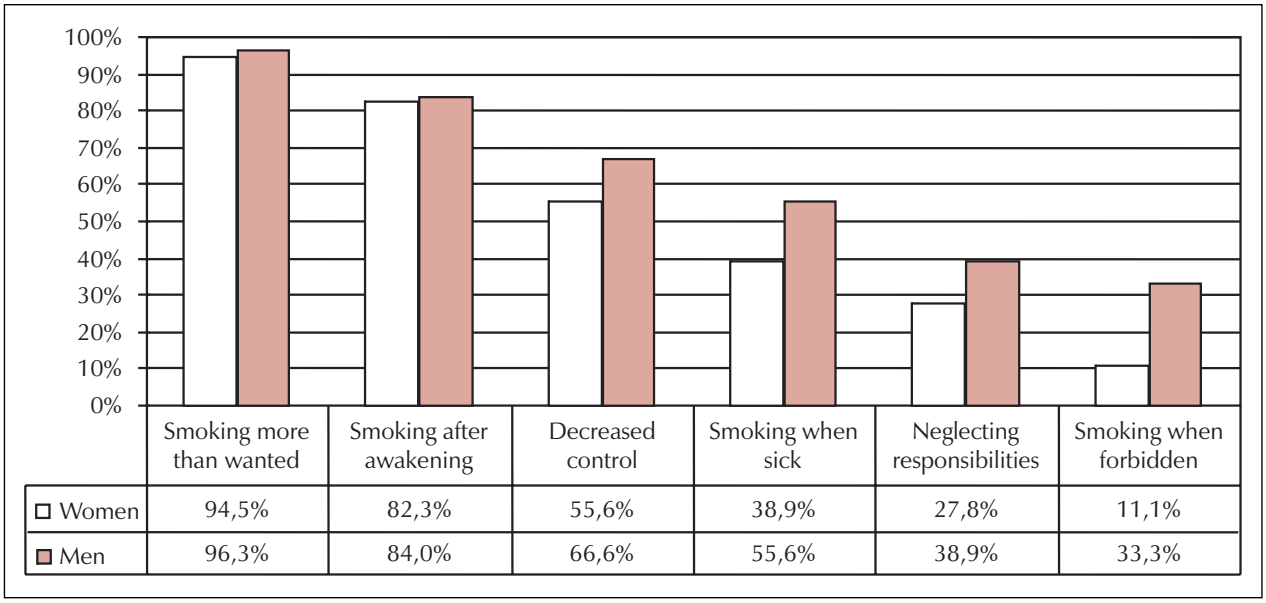


**FIGURE 1.** Smoking patterns in people with type 2 diabetes

due to smoking, but none of the comparisons has reached statistical significance. Overall, more than 40% of people with type 2 diabetes continue to smoke when they are sick and almost 1/5 of them still smoke even if smoking is forbidden.

The great majority (over 75%) of people with T2DM associates smoking with very frequent activities, such as drinking coffee or eating. Men are more likely to smoke when drinking alcohol (Kendall's tau $\tau = 0.40$, $p = 0.0001$).

As mentioned, we calculated the addiction severity by summing the assigned scores for all addiction components. It appears that men and women with diabetes have similar smoking addiction's severity ($m = 10.09 \pm 2.4$ for men and $m = 9.89 \pm 3.3$ for women, $t = 0.27$, $p > 0.05$). The smoking addiction is not associated with any of the clinical and laboratory data. The only valid correlation is with the educational level ($r = -0.30$, $p = 0.016$). More educated people (more years in school) smoke less.

The relationships between the number of cigarettes and the smoking addiction components are presented in table 2.

The association between the number of cigarettes smoked every day and the time after awakening and the lighting up of the first cigarette appears to be stronger than the relationships with the other addiction components. This relationship is statistically significant even after controlling for sex, age, educational level, DM duration, years of insulin treatment, blood pressure and lipids levels, abdominal circumference, years of smoking, number of quitting attempts or period of smoking abstinence ($pr = -0.47$, $p = 0.02$).

The majority of people with T2DM had approximately 2 quitting attempts (median value). The number of quitting attempts does not correlate with any of the demographical or clinical factors. Nevertheless, a person with many quitting attempts smokes less than another persons with fewer attempts to quit smoking (Spearman's rho $= 0.25$, $p = 0.03$), independently of all demographical and clinical variables listed above.

| | No. of cigarettes/day |
|---|---|
| **Addiction score** | $r = 0.264^{**}$ |
| **Awakening and first cigarette (min)** | $r = -0.330^{**}$ |
| **Illness** | $\rho = 0.229^{*}$ |
| **Forbidden** | $\rho = 0.269^{**}$ |

**TABLE 2.** Correlations between addiction components and the number of cigarettes

Data represent the Pearson's (r) and Spearman's rho (ρ) correlation coefficients.
Statistical significance at *p<0.05 and **p<0.01.

## Psychosocial factors related to smoking in type 2 diabetes

We investigated the reasons people with type 2 diabetes started and continue smoking at the time of the study. It appeared that the persuasion from significant other persons who already smoked was the most important reasons for starting smoking in almost half of the studied sample (47.2%). More than one third of people with T2DM started smoking because they were curios about this new experience. Other reasons for starting smoking were the desire to show the one's independence (9.7%) and to appear older and more mature (6.9%).

When evaluating the risk situations for increased smoking, we found that persons with diabetes are more likely to smoke when experience negative emotional states (anger, sadness, worry, Boredom, frustration) with no differences between men and women with diabetes. The data show that 41.7% of participants declared that they smoke more when angry, 22.2% when they feel sad. Boredom is a risk situation for increased smoking for approximately 11% of people with T2DM. It can be stated that smoking has perceived benefits on stress relief and coping with negative emotions.

These perceived advantages of smoking became more obvious when we investigated the reasons people with T2DM and a history of quitting smoking didn't succeed in their attempts. Smoking cessation failure is due to perceived impaired control over stress if not smoking (as declared by almost 30% of participants). The resumed smoking is also in order to reduce psychomotor agitation (in 40% of cases) or is due to habitual smoking (23% of persons).

Among the reasons of continuing smoking, the fear of weight gain deserves special attention. Comparing to men, women are more likely to resume smoking because they are concern about gaining weight ($\varphi = 0.41$, $p = 0.001$).

Despite the intense desire to quit smoking, expressed by almost all participants, this variable does not correlate with the number of cigarettes smoked per day ($r = -0.04$, $p > 0.05$) or with the duration or number of quitting attempts ($r = 0.22$, $p > 0.05$).

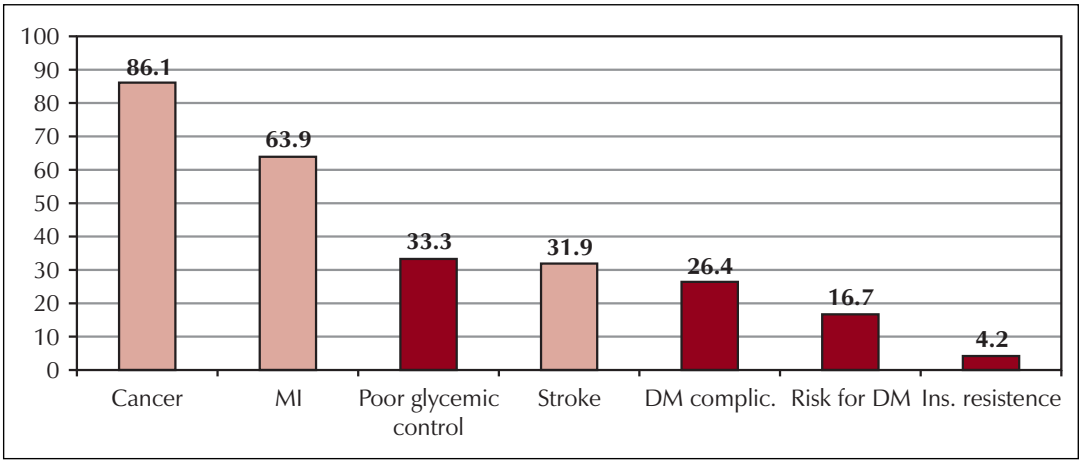


**FIGURE 2.** The knowledge level about the smoking consequences on health status (% of people with type 2 DM naming a specific smoking consequence). The dark columns represent the perceived diabetes-related consequences of smoking.

In order to obtain a complete image on smoking behaviors and motives for smoking of people with T2DM, the participants were asked to choose from a list the probable consequences on general health and on diabetes in particular. Figure 2 shows the percentage of people with T2DM considering that smoking is related to listed conditions. Cancer is the well-known consequence of smoking, followed by myocardial infarction. It can be observed that knowledge level on smoking consequences over diabetes progression and management is very low. Only 30% or less of people with T2DM know which the main consequences of smoking on diabetes care are.

The contribution of health care team on delivering information about smoking consequences on diabetes and in smoking cessation is perceived as insufficient (Figure 3). Only approximately 40% of people with type 2 diabetes discuss smoking issues with their diabetologists. The visual media is the leading source of information on smoking issue and the traditional educational environment is considered to have the least contribution in offering such kind of information. ❑

## DISCUSSIONS

In this study, people with T2DM reveal a moderate or high addiction, described as a decreased control over smoking, smoking more cigarettes during the mornings or when they are sick, lighting up the first cigarettes shortly after awakening or neglecting responsibilities because of the smoking. Subsequently, they smoke more cigarettes than people with low levels of smoking addiction. The smoking

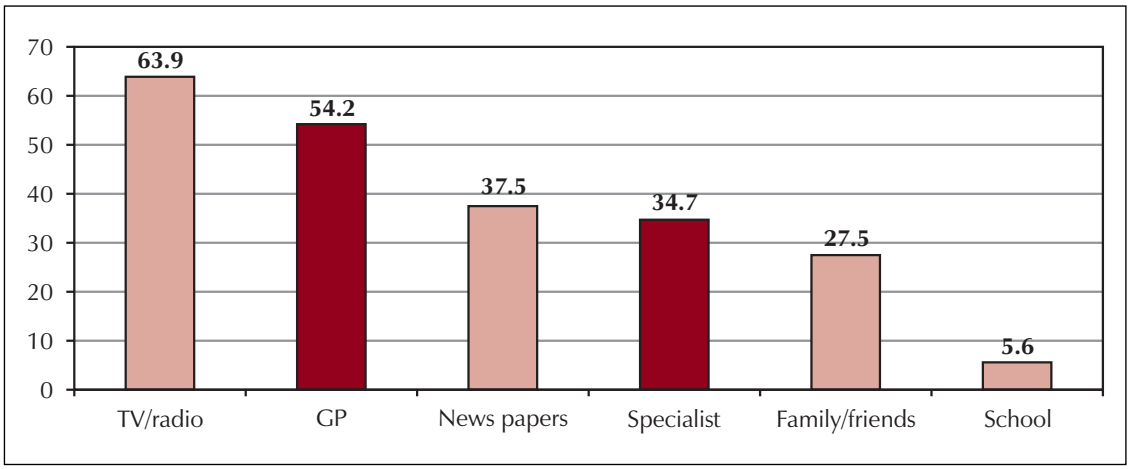


**FIGURE 3.** Information source about the smoking consequences on diabetes and on smoking cessation (% of people with type 2DM). The dark columns represent the medical source.

addiction levels are similar in men and women with T2DM.

The number of cigarettes people with type 2 DM smoke is independent of demographic characteristics (age, years of education), current medical status (BMI, blood pressure, lipids levels), diabetes-related characteristics (duration of DM or insulin treatment) or smoking cessation attempts and total cessation period. These results suggest that the characteristics of diabetes and related conditions do not influence the smoking attitudes and behavior. A smoker with a poorer metabolic control will probably not alter his smoking habits because of his medical conditions.

Unfortunately, the high-risk situations for increased smoking are highly frequent activities, such as eating, drinking coffee or alcohol. These associations could have a negative impact on smoking cessation interventions, but also emphasize the importance of specific, individualized approach in order to increase the chances to quit. For the same reason, it is important to identify other psychological factors related to smoking in people with diabetes. In this study, people with T2DM are at an increased risk to smoke if they experience intense negative emotions, such as anger, sadness or boredom. In order to this, smoking is perceived as paying a role in stress relief and coping with negative emotions. The reasons that people with diabetes resume smoking after several quitting attempts are mainly of emotional nature. The fear of weight gain is also an important factor that contributes to failure of quitting attempts, being more frequent in women with T2DM. Similar results have been also reported in other studies (7).

We found that people with T2DM have a surprisingly low knowledge level about the smoking consequences over diabetes management and progression. They consider the medical team having a scarce contribution in offering adequate information about smoking consequences over diabetes care. A high percentage of people with diabetes not receiving any advice from a physician to quit smoking is also reported in the literature (8).

The study has some limitations. First limitation is the lack of a control group consisted of smokers without diabetes. Our results do not imply that the found smoking pattern, high-risk situations or the knowledge level about smoking consequences are specific to the diabetic population. The results we obtain on our sample of persons with T2DM can be defined and completed after comparisons of smoking attitudes and behaviors of smokers with and without diabetes.

On the other hand, a comparison with people with diabetes who do not smoke has a great importance because of the high probability of smokers with diabetes to display depressive disorders and a less involvement in their diabetes care (9).

Given the importance of emotional factors in maintaining the smoking behavior, the evaluation of affective status as depression and anxiety and the analysis of their relationship with smoking pattern is a desirable approach in further studies. ❑

## CONCLUSION

The present study intended to identify the psychosocial factors related to smoking behaviors in people with type 2 diabetes. The main psychological contributors on continuing smoking are the perceived smoking benefits on reducing negative emotional states, facilitating socialization, fear of weight gain (especially for women).

Summarizing, we can circumscribe the following practical implications:

1. Professionals involved in diabetes care should not expect people with type 2 DM stop smoking because of their current medical status (hypertension, dyslipidemia, obesity, insulin treatment);
2. The health care team members should not expect people with type 2 DM stop smoking because of the proven negative consequences that this habit has on diabetes progression or management;
3. The knowledge level on smoking consequences over diabetes progression and management is surprisingly low in the studied sample of people with T2DM;
4. There is a low rate of advising and counseling people with diabetes for smoking cessation from medical staff;
5. Smoking status should be included as a "vital sign" in the routine consultation in order to enhance the physician's time and resources spent with smokers with diabetes.

Unfortunately, smoking cessation programs are fewer than needed (8) and less effective than expected (10-11). As reported elsewhere (12), these programs should be tailored accordingly to the psychosocial factors related to smoking rather than medical characteristics. Further studies including several groups of smokers and non-smokers with and without diabetes are mandatory to extend the validity of our results.

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