ORIGINAL ARTICLES

Deteriorated Health-Related Quality of Life in Healthy Male Smokers

Aurelio Cayuela,[a] Susana Rodríguez-Domínguez,[b] and Remedios Otero[c]

[a]Unidad de Apoyo a la Investigación, Hospital Universitario Virgen del Rocío, Sevilla, Spain.
[b]Fundación Progreso y Salud, Sevilla, Spain.
[c]Unidad Médico-Quirúrgica de Enfermedades Respiratorias, Hospital Universitario Virgen del Rocío, Sevilla, Spain.

OBJECTIVE: To analyze the association between smoking and health-related quality of life (HRQL) in male smokers compared to male nonsmokers, both with no history of chronic disease, at 3 health centers in Seville, Spain.

PATIENTS AND METHODS: We conducted a retrospective cohort study of smokers and nonsmokers who were matched on the basis of potentially confounding variables (age, marital status, occupation, education, and health center). Data were compiled in interviews conducted by a qualified and previously trained interviewer. HRQL was assessed using the 36-item short form general health questionnaire (SF-36).

RESULTS: Except for the physical functioning dimension, which refers to physical activities of daily living (*P*=.111), smokers had significantly worse (*P*<.05) HRQL scores measured with the SF-36 questionnaire. On average, smokers scored 10 points less than nonsmokers in the 8 HRQL dimensions. The greatest difference was observed in the dimensions reflecting mental health, particularly in limitations experienced as a consequence of emotional problems (emotional role score 14 points less for smokers; *P*=.001).

When compared to Spanish norms, the scores of smokers were on average 12 points lower in the 8 HRQL dimensions. The greatest differences were observed in physical role (31 points) and bodily pain (17 points).

CONCLUSIONS: Even smokers who have not developed acute or chronic comorbidity associated with cigarette smoking have a poorer HRQL than nonsmokers.

Key words: *Health-related quality of life. Tobacco. Males.*

Deteriodo de la calidad de vida relacionada con la salud en fumadores sanos

OBJETIVO: Analizar la asociación entre el consumo de tabaco y la calidad de vida relacionada con la salud (CVRS) en varones fumadores y no fumadores sin historia de enfermedad crónica en 3 centros de salud de Sevilla.

PACIENTES Y MÉTODOS: Realizamos un estudio de cohortes retrospectivas (fumadores y no fumadores) pareadas en variables que pueden actuar como variables de confusión (edad, estado civil, ocupación, nivel de estudios y centro de salud de referencia). Los datos fueron recogidos mediante entrevista por un encuestador cualificado y previamente entrenado. La CVRS se valoró mediante el cuestionario de salud SF-36

RESULTADOS: Excepto para la dimensión función física, es decir, para el desarrollo de actividades físicas de la vida diaria (p = 0,111), los fumadores presentaron peores puntuaciones (estadísticamente significativas; p < 0,05) en las diferentes dimensiones de la CVRS medidas con el cuestionario SF-36. Los fumadores presentaron en promedio 10 puntos menos en las 8 dimensiones de la CVRS que los no fumadores. La mayor diferencia se observó en dimensiones relacionadas con la salud mental, especialmente con limitaciones debidas a problemas emocionales (diferencia en rol emocional de –14 puntos; p = 0,001).

En comparación con los valores de referencia nacionales, los fumadores presentaron en promedio 12 puntos menos en las 8 dimensiones de la CVRS. Las mayores diferencias se observaron en rol físico (31 puntos) y dolor corporal (17 puntos).

CONCLUSIONES: Los fumadores, aun sin presentar comorbilidad aguda o crónica asociada al consumo de tabaco, presentan una peor CVRS que los no fumadores.

Palabras clave: *Calidad de vida relacionada con la salud. Tabaco. Varones.*

Introduction

Smoking is closely associated with a loss of years of healthy life.[1] In Spain, the human cost of smoking is premature death, illness, incapacity, and unnecessary suffering.[2]

A subjective appraisal of the general state of health of a smoker is a good predictor of mortality.[3] Several studies have found an association between smoking and a

This study was partly funded by the Andalusian public health service (Consejería de Salud de la Junta de Andalucía) under Research Project No. 17/02.

Correspondence: Dr. A. Cayuela.
Centro de Documentación Clínica. Hospitales Universitarios Virgen del Rocío.
Avda. Manuel Siurot, s/n. 41013 Sevilla. España.
E-mail: aurelio.cayuela.sspa@juntadeandalucia.es

Manuscript received November 3, 2005.Accepted for publication February 28, 2006.

deterioration in health-related quality of life (HRQL).[4-7] Cross-sectional studies have shown that smokers have poorer physical and mental health compared to nonsmokers.[8-10] They also have poorer physical functioning in terms of performing activities of daily living.[11,12] Cohort studies have confirmed the association between smoking and deteriorated mental health and physical functioning,[13] and lower scores on physical and mental HRQL dimensions have been observed in healthy young people with a short history of smoking in comparison with nonsmoking youth.[14] Moreover, smoking may be associated with short-term perception of poorer health even in the absence of any chronic disease.

Around 38% of Andalusian males aged over 16 years are habitual smokers,[15] and 70% of smokers visit their family practitioner at least once a year.[16] In view of the above, our aim was to analyze the association between smoking and HRQL in male smokers and compare this with the HQRL of male nonsmokers. The study was conducted at 3 health centers in Seville, Spain. None of the males had a history of chronic disease.

Patients and Methods

We conducted a retrospective cohort study of smokers and nonsmokers, matched[17] on the basis of variables that have been demonstrated in previous studies to be potential confounders (age,[18] marital status, occupation, and educational level[19]). For the purposes of our study, a "case" was a smoker (at least one cigarette smoked a day in the previous year), male, aged 30 years or more, with no smoking-related chronic or acute disease (cancer, cardiovascular disease or respiratory disorders), who visited a health center for preventative reasons (vaccinations or educational programs) or to accompany another patient. Younger males were excluded on the basis that they visit health centers less often. The 3 health centers included in the study—all located in the province of Seville in Andalusia, Spain—were as follows: Centro de Salud Pino Montano and Centro de Salud San Pablo (urban), and Centro de Salud Bollullos de la Mitación (rural). Women were excluded given the gender differences observed in previous studies of HRQL and given the relatively low prevalence of smoking among women in our practice setting.

The control subjects were men who had never smoked and who had no chronic disease. Controls were matched with cases on the basis of age, marital status, occupation, educational level, and health center.

Data were recorded in interviews conducted by a qualified and previously trained interviewer.

HRQL was assessed by means of the 36-item short form general health questionnaire (SF-36), adapted for use in Spain.[20] The Spanish version of the SF-36 reflects norms for the Spanish population. The 36 items in the questionnaire evaluate 8 different dimensions of health, as follows: physical functioning (degree to which health limits physical activities such as personal care, walking, climbing stairs, stooping, lifting heavy objects, etc, as also moderate or intense physical effort); physical role (degree to which health interferes with work and other activities of daily living, and including a lower level of accomplishment of tasks than desired, limitations on the type of activities performed, and difficulties experienced in performing activities); bodily pain (pain intensity and its effect on habitual work both at home and outside the home); general health (personal appraisal of current health, future expectations as to state of health, and resistance to illness); vitality (feelings of energy and vitality as opposed to feelings of tiredness and fatigue); social functioning (degree to which health interferes with social life); emotional role (degree to which emotional problems interfere with work and other activities of daily living, including a reduction in the time spent on activities, a lower level of accomplishment of tasks than desired, and less thoroughness in performing work); and mental health (general mental health, referring to episodes of depression and anxiety, control over behavior, and general wellbeing). (cuestionnaire available from: http://iryss.imim.es/iryss/.) The items for each dimension of the SF-36 were coded and aggregated, then transformed on a scale ranging from 0 (reflecting the poorest state of health) to 100 (reflecting the best state of health). The procedures used are those described in the manual for scoring and interpreting the Spanish version of the SF-36.[21]

Sample Size and Sampling

Assuming α=0.05 and β=0.20 for a one-way comparison, it was established that 120 individuals were required in each group in order to detect a difference of at least 5 HRQL points (considered clinically important in previous studies), with a SD of 22 points. Smokers who attended the 3 participating health centers in the second quarter of 2005 were randomly sampled and each case was matched with a control who met the pre-established criteria; ie, matched cases and controls had the same age, marital status, occupation, and educational level, and both used the same health center.

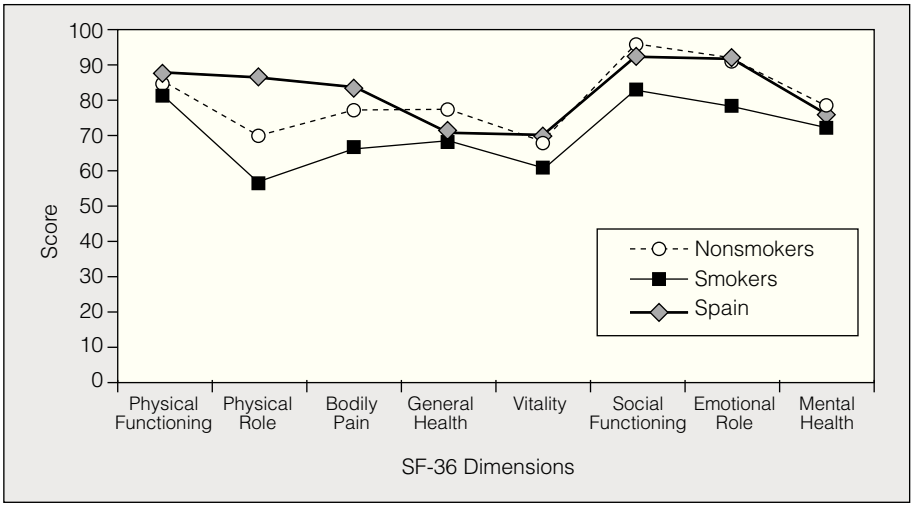
Statistical Analysis

For each SF-36 dimension, mean (SD), median, range, and interquartile range (IQR) were calculated for the scores, for the subgroup of individuals with the maximum score (ceiling effect) and for the subgroup of individuals with the minimum score (floor effect). These calculations were performed for both the smoker and nonsmoker groups.

Given that the Kolmogorov–Smirnov test revealed a non-normal distribution of the SF-36 scores, we used the Wilcoxon test (a non-parametric test applied to 2 related samples in order to test the hypothesis that 2 variables have the same distribution) to compare scores for smokers and nonsmokers.

TABLE 1
Distribution of Matched Variables in the Sample of 120 Smokers and 120 Nonsmokers

Characteristics	Percentage
Age, y	
30-39	46.7
40-49	20.8
≥50	32.5
Marital status	
Single	11.0
Married	82.9
Separated/divorced	4.8
Widowed	1.2
Educational level	
No schooling	20.7
Primary	51.2
Secondary-1st cycle	20.7
Secondary-2nd cycle	6.1
Tertiary	1.3
Occupational status	
Employed	67.1
Unemployed	11.0
Retired	19.5
Other	2.4



SF-36 questionnaire dimensions: mean scores for smokers and nonsmokers in our study and Spanish population reference values

Results

Table 1 shows the distribution of frequencies for the variables for which smokers and nonsmokers were matched. The mean age (SD) of patients in both groups was 47.5 (14) years. A relatively large percentage of subjects had no schooling (21.7%) or just primary education (51.2%).

Table 2 shows the median (IQR) scores for the 8 dimensions of the SF-36 questionnaire. Except for the physical functioning dimension, which refers to physical activities of daily living (*P*=.111), smokers had significantly poorer (*P*<.05) scores in all the SF-36 dimensions (Table 2 and Figure). On average, smokers scored 10 points less than nonsmokers in the 8 HRQL dimensions. The greatest difference was observed in the dimensions reflecting mental health, particularly in limitations experienced as a consequence of emotional problems (the emotional role score for smokers was14 points less than for nonsmokers, *P*=.001).

In comparison with Spanish population norms, the smokers in our study scored an average of 12 points less across the 8 HRQL dimensions (Table 3 and Figure). The greatest differences were observed in physical role (31 points) and bodily pain (17 points). Although the nonsmokers obtained a mean score that was, on average, 2 points lower than for the general population, of note was a substantial difference of 17 points less for physical role.

Discussion

In general, smokers tend to become alert to the symptoms associated with long-term smoking in the fourth decade of life.[22] Although most smokers observe the adverse effects of smoking on their health,[22] there are no objective measures of the magnitude of these effects. It is thus difficult to convince smokers that their health is being affected by smoking until specific diseases occur, and this delay makes it difficult for them to find the motivation to give up the habit. Specific tools that evaluate health results—such as HRQL scales for measuring perceptions of health—are objective measures of the mental, physical and social impact of smoking.[22] They are therefore a potentially useful tool for persuading smokers that their health is being affected by their addiction.

Although many smokers have no evident health problems, tobacco combustion results in the production of potentially damaging toxic agents; this, consequently, justifies an appraisal of HRQL in smokers.

Comparing the overall results for our population of smokers and nonsmokers, the mean scores in some dimensions (physical role, bodily pain, vitality, and emotional role) were, from a clinical point-of-view, significantly lower that the national population norms for the SF-36 questionnaire (Table 3). These differences can be explained by the relatively large proportion of our

TABLE 2
SF-36 Score Distributions For Smokers (n=120) and Nonsmokers (n=120)*

Dimensions	Nonsmokers	Smokers	Total (n=240)	*P*
Physical functioning	100 (80-100)	90 (75-100)	95 (75-100)	.111
Physical role	100 (25-100)	100 (0-100)	100 (0-100)	.043†
Bodily pain	100 (61-100)	72 (41-100)	84 (51-100)	.014†
General health	77 (68-92)	72 (57-82)	77 (65-87)	.0001†
Vitality	70 (55-85)	60 (50-70)	60 (50-80)	.006†
Social functioning	100 (100-100)	100 (75-100)	100 (100-100)	.0001†
Emotional role	100 (100-100)	100 (67-100)	100 (100-100)	.001†
Mental health	80 (72-88)	80 (60-88)	80 (68-88)	.032†

*Data are expressed as median (interquartile range).
† Statistically significant differences.

sample with no schooling or only primary education, which at 71.9% was higher than in the reference population (44.8%).[18] People with lower educational levels tend to obtain lower SF-36 scores.[19]

Even though the male smokers in our study had no smoking-related disease, they obtained mean SF-36 scores that were lower than those of male nonsmokers and lower than the population norms for Spanish males (Tables 1 and 3, and Figure).

Despite the fact that smoking appears not to limit the performance of activities of daily living (physical functioning), it does affect physical role, which refers to the performance of more intense physical activities (Tables 2 and 3). Smokers may present with normal spirometry values, yet they can still have mucosal hypersecretion, reduced carbon monoxide diffusing capacity in the lungs, and peripheral airflow obstruction, for which reason it has been suggested that the differences between smokers and nonsmokers may be variously attributed to cough and phlegm, differences in lung function tests, and/or exercise capacity.[23] Another possible mechanism to account for differences is musculoskeletal lesions due to vasoconstriction and hypoxia[24] or other events that negatively affect tissue nutrition or structure.[25] This would explain—at least in part—the physical pain experienced by smokers, given that the perception of pain is mediated by the psychostimulant effects of nicotine.[26] Nonetheless, the association between nicotine and pain perception may well be confounded by other factors, such as heavier physical effort at work, or neuropsychological and/or sociocultural factors, which have been observed to differ systematically between those who smoke and those who do not.[27] If smoking increases susceptibility to pain, then this is just one more reason not to smoke, although, if smokers complain more of pain, then it is necessary to determine the causes.

TABLE 3
SF-36 Score Distributions for Smokers and Nonsmokers and Spanish Population Norms for Men*

	Smokers	Nonsmokers	Total	Spanish Norms for Men
Physical functioning				
Mean (SD)	81.8 (24.6)	85.8 (23.2)	83.8 (23.9)	88.2 (21.5)
Observed range	0-100	20-100	0-100	0-100
Ceiling effect (100)	38.3	55.0	46.7	55.2
Floor effect (0)	2.5	0	1.3	1.1
Physical role				
Mean (SD)	56.3 (48.5)	69.8 (43.5)	63.0 (46.5)	87.2 (31.5)
Observed range	0-100	0-100	0-100	0-100
Ceiling effect (100)	54.2	64.2	59.2	55.2
Floor effect (0)	39.2	23.3	31.3	10
Bodily pain				
Mean (SD)	66.6 (32.5)	77.5 (31.3)	72.0 (32.3)	84.0 (24.9)
Observed range	0-100	0-100	0-100	0-100
Ceiling effect (100)	37.5	56.7	47.1	63.1
Floor effect (0)	3.3	5.0	4.2	1.0
General health				
Mean (SD)	68.8 (17.2)	77.8 (16.3)	73.3 (17.3)	70.8 (21.5)
Observed range	15-100	15-100	15-100	0-100
Ceiling effect (100)	2.5	2.5	2.5	3.4
Floor effect (0)	0	0	0	0.3
Vitality				
Mean (SD)	60.8 (19.4)	68.2 (17.6)	64.5 (18.8)	70.5 (21.1)
Observed range	10-100	0-100	0-100	0-100
Ceiling effect (100)	0.8	4.2	2.5	8.9
Floor effect (0)	0	0.8	0.4	0.5
Social functioning				
Mean (SD)	83.0 (30.0)	95.9 (14.1)	89.5 (24.3)	92.5 (17.6)
Observed range	0-100	25-100	0-100	0-100
Ceiling effect (100)	68.3	90	79.2	78.0
Floor effect (0)	3.3	0	1.7	0.7
Emotional role				
Mean (SD)	78.6 (37.9)	92.5 (24.2)	85.6 (32.5)	92.9 (24.1)
Observed range	0-100	0-100	0-100	0-100
Ceiling effect (100)	74.2	90.0	82.1	91.2
Floor effect (0)	14.2	0	9.6	5.4
Mental health				
Mean (SD)	72.7 (21.3)	78.5 (14.8)	75.6 (18.5)	76.9 (18.6)
Observed range	16-100	24-100	16-100	0-100
Ceiling effect (100)	5.0	5.0	5.0	7.7
Floor effect (0)	0	0	0	0.2

*Data taken from Alonso et al.[18]

In our study, the large differences observed between smokers and nonsmokers in the dimensions reflecting mental health—particularly in limitations experienced as a consequence of emotional problems (social role and emotional role)—may respond to a difference in psychological profiles. It has been observed that a history of depression, low self-esteem, and a predisposition to the adoption of an unhealthy lifestyle are associated with smoking initiation.[28] It has also been observed that the age at which adolescents start smoking is associated with reduced overall satisfaction with life.[28]

Another possible explanation for our findings is that smoking has an effect on perception of health irrespective of its somatic effects (eg, smoking is associated with situations of stress and poorer social adaptation, which, in turn, may affect perception of health).

In conclusion, male smokers who have not developed comorbidity associated with smoking have a poorer HRQL than nonsmokers.

REFERENCES

1. Ostbye T, Taylor DH. The effect of smoking on years of healthy life (YHL) lost among middle-aged and older Americans. Health Serv Res. 2004;39:531-52.
2. Banegas Banegas JR, Díez Gañan L, Rodríguez-Artalejo F, González Enríquez J, Graciani A, Villar F. Mortalidad atribuible al tabaquismo en España en 1998. Med Clin (Barc). 2001;117:692-4.
3. Idler EL, Benyamini Y. Self-rated health and mortality: a review of twenty-seven community studies. J Health Soc Behav. 1997; 38:21-37.
4. Woolf SH, Rothemich SF, Johnson RE, Marsland DW. Is cigarette smoking associated with impaired physical and mental functional status? An office-based survey of primary care patients. Am J Prev Med. 1999;17:134-7.
5. Lyons RA, Lo SV, Littlepage BNC. Perception of health amongst ever-smokers and never-smokers: a comparison using the SF-36 Health Survey Questionnaire. Tob Control. 1994;3:213-5.
6. Wilson D, Parsons J, Wakefield M. The health-related quality-of-life of never-smokers, ex-smokers, and light, moderate and heavy smokers. Prev Med. 1999;29:139-44.
7. Tillman M, Silcock J. A comparison of smokers' and exsmokers' health-related quality of life. J Public Health Med. 1997;19:268-73.
8. Jorm AF. Association between smoking and mental disorders: results from an Australian National Prevalence Survey. Aust N Z J Public Health. 1999;23:245-8.
9. Anda RF, Williamson DF, Escobedo LG, Mast EE, Giovino GA, Remington PL. Depression and the dynamics of smoking. A national perspective. JAMA. 1990;264:1541-5.
10. Jorm AF, Rodgers B, Jacomb PA, Christensen H, Henderson S, Korten AE. Smoking and mental health: results from a community survey. Med J Aust. 1999;170:74-7.
11. Hirdes JP, Maxwell CJ. Smoking cessation and quality of life outcomes among older adults in the Campbell's Survey on WellBeing. Can J Public Health. 1994;85:99-102.
12. Maxwell CJ, Hirdes JP. The prevalence of smoking and implications for quality of life among the community-based elderly. Am J Prev Med. 1993;9:338-45.
13. Strawbridge WJ, Camacho TC, Cohen RD, Kaplan GA. Gender differences in factors associated with change in physical functioning in old age: a 6-year longitudinal study. Gerontologist. 1993; 33:603-9.
14. Martinez JA, Mota GA, Vianna ES, Filho JT, Silva GA, Rodrigues AL Jr. Impaired quality of life of healthy young smokers. Chest. 2004;125:425-8.
15. Junta de Andalucía. Consejería de Asuntos Sociales. II Plan Andaluz sobre Drogas y Adicciones (2002-2007). Sevilla: Consejería de Asuntos Sociales; 2001.
16. Jiménez CA, Barrueco M, Solano S, Torrecilla M, Domínguez F, Díaz-Maroto JL, et al. Recomendaciones en el abordaje diagnóstico y terapéutico del tabaquismo. Documento de consenso. Arch Bronconeumol. 2003;39:35-41.
17. Rothman KJ, Greenland S. Modern epidemiology. Philadelphia: Lippincott-Raven; 1998. p. 147-61, 283-5.
18. Alonso J, Regidor E, Barrio G, Prieto L, Rodríguez C, Fuente L. Valores poblacionales de referencia de la versión española del Cuestionario de Salud SF-36. Med Clin (Barc). 1998;111:410-6.
19. Regidor E, Barrrio G, de la Fuente L, Domingo A, Rodríguez C, Alonso J. Association between educational level and health related quality of life in Spanish adults. J Epidemiol Community Health. 1999;53:75-82.
20. Alonso J, Prieto L, Antó JM. La versión española del SF-36 Health Survey (Cuestionario de Salud SF-36): un instrumento para la medida de los resultados clínicos. Med Clin (Barc). 1995;104:771-6.
21. Manual de puntuación de la versión española del Cuestionario de Salud SF-36 [cited 2006 Jan 10]. Available from: http://iryss.imim.es/iryss/PDFs/Manual-Puntuación_SF-36v1.pdf .
22. Bellido J, Martín J, Dueñas A, Mena FJ, Arzúa D, Simal F. The SF-36 Questionnaire as a measurement of health-related quality of life: assessing short- and medium-term effects of exposure to tobacco versus the known long-term effects. Eur J Intern Med. 2004;15: 511-7.
23. Heijdra YF, Pinto-Plata VM, Kenney LA, Rassulo J, Celli BR. Cough and phlegm are important predictors of health status in smokers without COPD. Chest. 2002;121:1427-33.
24. Watson A, Joyce H, Hopper L, et al. Influence of smoking habits on change in carbon monoxide transfer factor over 10 years in middle aged men. Thorax. 1993;48:119-24.
25. Frymoyer JW, Pope MH, Clements JH, Wilder DG, MacPherson B, Ashikaga T. Risk factors in low back pain. J Bone Joint Surg Am. 1983;65:213-8.
26. Brage S, Bjerkedal T. Musculoskeletal pain and smoking in Norway. J Epidemiol Community Health. 1996;50:166-9.
27. Palmer KT, Syddall H, Cooper C, Coggon D. Smoking and musculoskeletal disorders: findings from a British national survey. Ann Rheum Dis. 2003;62:33-6.
28. Zullig KJ, Valois RF, Huebner ES, et al. Relationship between perceived life satisfaction and adolescents' substance abuse. J Adolesc Health. 2001;29:279-88.