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Pathological Gambling: Relationship to Obesity, Self-Reported Chronic Medical Conditions, Poor Lifestyle Choices, and Impaired Quality of Life

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Abstract

Background—Pathological gambling (PG) is an important public health problem that is prevalent, costly to society, and associated with substance misuse, depression, domestic violence, crime, and suicide. Despite these challenges, little is known about the physical health and medical correlates of PG. The goal of this project was to assess self-reported chronic medical conditions, medication usage, lifestyle choices, health care utilization, quality of life variables, and body mass index (BMI) in persons with and without PG.

Methods—Subjects with PG and community controls were systematically assessed for their medical health, lifestyle choices, medication usage, and health care utilization. We administered the Medical Outcome Study Short-Form 36 Health Survey to assess perceived health and quality of life. BMI was calculated for all subjects. Obesity was defined as having a BMI ≥ 30 kg/m².

Results—We compared 95 subjects with DSM-IV PG (South Oaks Gambling Screen [SOGS] score ≥ 5) and 91 control subjects without PG (SOGS ≤ 2) selected through random digit dialing from the general community. PG subjects and controls were similar in age and gender. Persons with PG had more medical and mental health conditions than controls, and were more likely to avoid regular exercise, smoke ≥ 1 pack/day, drink ≥ 5 servings of caffeine daily, and watch television ≥ 20 hours/week. They had more emergency department visits for physical and mental health conditions, were more likely to have been psychiatrically hospitalized in the past year, and were more likely to take psychotropic medication. They were less likely to have had regular dental visits and were more likely to put off medical care due to financial problems. Severity of gambling was positively correlated with number of medical conditions. Persons with PG had poorer self-reported health perceptions on all but one SF-36 subscale. Importantly, persons with PG had a higher BMI than controls and were more likely to be obese.

Conclusions—PG is associated with obesity, chronic medical conditions, poor lifestyle choices, worse quality of life, and the use of costly forms of medical care. Pathological gamblers are less likely to receive regular dental care and are more likely to be unable to pay for medical care. The implications of the findings are discussed.

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Keywords

pathological gambling; health perceptions; obesity; health care utilization; lifestyle

Pathological gambling (PG) is prevalent, costly to society, and associated with substance misuse, depression, domestic violence, crime, and suicide.¹⁻⁷ Nearly 90% of the general adult population participates in some form of gambling,⁸ and an estimated 1.2%-3.4% develop PG, the most severe form of disordered gambling.^{1,2} Problem ("at risk") gambling may be even be more common with lifetime prevalence estimates of 3.5%-5.1%.⁹ Additionally, PG is associated with mood and anxiety disorders, substance use disorders, and antisocial behavior.¹⁰ Despite these challenges, little is known about the physical health and medical correlates of PG.

Several clinical and epidemiologic studies have reported an association between disordered gambling and adverse health consequences beginning with small descriptive studies of both problem gamblers and their spouses that documented depression, insomnia, intestinal disorders, headaches and other stress-related disorders, as well as high rates of sick leave and poorer self-appraisal of health.¹¹⁻¹³ Following on the heels of these reports have been a spate of epidemiologic studies that have linked disordered gambling with adverse health conditions or behaviors. Morasco et al.¹⁴ reported that among more than 43,000 persons assessed as part of the National Epidemiologic Survey of Alcohol and Related Conditions (NESARC) study, persons with PG were more likely to have symptoms of tachycardia, angina, cirrhosis, or other liver disease; they also reported greater health care utilization, including emergency department visits. In a survey of 1051 primary care patients, Pasternak and Fleming¹⁵ found more alcohol and tobacco use, worse self-reported health, and more symptoms of heartburn and backache among the 6.2% with a gambling disorder than among non-gamblers. In adults seen in an urban primary care clinic, Morasco et al.¹⁶ found that increasing gambling severity was associated with worse physical and emotional health. Associations between worse health indices and disordered gambling have been reported in adolescents, elderly people, persons receiving disability, dental clinic patients, and persons followed in a methadone clinic.¹⁷⁻²¹

These studies indicate that disordered gambling is associated with poor health outcomes, yet there have been no studies in which the medical health status of carefully assessed subjects with PG has been compared to that of an appropriate control group. We now report data from a comparison of subjects with PG and controls. We hypothesize that persons with PG are more likely than controls to have worse self-reported health and quality of life, to report more medical symptoms and syndromes, to have greater use of emergency and other medical services, to use more medications, and to be obese.

Methods

Subjects

Subjects were recruited in the course of a family study of PG through a study registry, advertisements, meetings of Gamblers Anonymous, and word of mouth. They were interviewed between February 2005 and June 2010. Controls were recruited through random digit dialing methods by the Center of Social and Behavioral Research at the University of Northern Iowa (Cedar Falls, IA) and were approximately matched to PG subjects for sex and age.

Subjects with PG were required to have a South Oaks Gambling Score (SOGS)²² ≥ 5 and a NORC DSM Screen for Gambling Problems (NODS)⁶ score ≥ 5 ; they also had to meet

DSM-IV PG criteria.²³ All subjects were at least 18 years, spoke English, and they could not have a psychotic, cognitive, or a chronic neurological disorder (e.g., Parkinson's disease). Controls were required to have a SOGS score ≥ 2 and a NODS score of 0. Written, informed consent was obtained from all subjects according to procedures approved by University of Iowa Institutional Review Board.

Assessments

We modified the Medical History and Services Utilization Interview created by Frankenburg and Zanarini²⁴ to collect data on self-reported medical care and treatment, chronic medical conditions, health-related lifestyle choices, and medical services utilization, including emergency department visits, physician and dentist visits, hospitalizations, and psychotropic drugs taken. The instrument is reported to have moderate to excellent reliability.²⁴ We also administered the Medical Outcome Short Form-36 (SF-36) Health Survey²⁵ to gather objective data about medical health and quality of life. Body Mass Index (BMI) was calculated for all subjects using their self-reported weight and height. BMI was calculated by dividing weight in kilograms by the height in meters squared. Obesity was defined as having a BMI of ≥ 30 kg/m².

Statistical Analysis

PG and control subjects were compared on social and demographic characteristics using the Chi-square test for categorical variables and the Mann-Whitney test for dimension variables. Logistic regression modeling was used to test for differences in health-related lifestyle choices between PG subjects and controls.²⁶ Sex, age, race (Caucasian vs. other), and years of schooling were used as covariates. To account for multiple outcomes being studied, the difference between groups was tested using a multivariate score test, analogous to MANOVA for continuous outcomes.²⁷ The dichotomous health-related lifestyle choices were grouped as *healthy lifestyle choices* (e.g., regular exercise, taking a multi-vitamin) and *unhealthy habits and behaviors* (e.g., tobacco use, drinking alcohol). In addition to the multivariate tests, odds ratio estimates and 95% confidence intervals are reported for the group differences. The same logistic regression methodology was used to test for differences between PG subjects and controls for health care utilization and chronic medical conditions. Dichotomous health care utilization outcomes were grouped as *regular medical care*, *financial barriers to medical care*, *psychotropic medication usage*, and *urgent medical care*. Eleven of the PG subjects were recruited when they were in a clinical setting (e.g., inpatient, outpatient). To remove the natural bias caused by recruitment in these settings, the subjects were removed from the analyses for the outcomes grouped under urgent medical care and psychotropic medication usage. Under chronic medical conditions, outcomes were grouped as *chronic physical health conditions* and *chronic mental health conditions*.

MANOVA was used to test for group differences in quality of life measures (SF-36 results) and other dimensional measures of health. Sex, age, race, and years of schooling were used as covariates. In addition to the MANOVA test, estimates of mean group differences are reported, along with their confidence intervals and p values. Among subjects with PG, we also tested correlations between gambling severity (NODS and SOGS scores) and medical outcomes (BMI, total number of chronic medical conditions, and SF-36 results). Statistical significance was set at $p < .05$.

Results

Table 1 shows the social and demographic characteristics of 95 subjects with PG and 91 controls. As can be seen, the two groups were similar in age and gender. Overall, 90% of the subjects were Caucasian, 6% African-American, 2% Hispanic/Latino, and 2% American

Indian. Using a dichotomous variable for race (Caucasian vs. other), the PG group had a smaller proportion of minority subjects. PG subjects had fewer years of education. Occupational status was assessed by asking subjects to check each category that applied during the last 12 months. Therefore, subjects could be classified as both employed and unemployed, for example. Subjects with PG were less likely to be homemakers or retired, but were more likely to be disabled. More subjects with PG were unemployed in the past year, but the difference was not significant. Subjects with PG were more likely to be separated or divorced. Among subjects with PG, the mean (SD) SOGS total score was 13.4 (3.7).

Table 2 shows the prevalence of health-related lifestyle choices. The two groups had differences in healthy lifestyle choices and unhealthy habits and behaviors ($p<.001$ for both tests). Specifically, PG subjects were more likely to avoid regular exercise ($OR=2.38$, $p=.007$), to drink alcoholic beverages while pregnant ($OR=4.88$, $p=.041$), to smoke one pack of cigarettes per day (or one can of chewing tobacco) ($OR=6.51$, $p<.001$), to drink 5 servings of caffeine daily ($OR=4.08$, $p=.002$), and to watch 20 hours of television weekly ($OR=3.28$, $p=.003$).

Table 3 compares health care utilization for PG and control subjects. The two groups were significantly different with respect to regular medical care ($p=.003$). Subjects with PG were more likely to have seen a specialist in the past year and to have received a magnetic resonance imaging/computerized tomographic scan, but were less likely to have seen a dentist for regular checkups ($OR=0.40$, $p=.015$). The two groups were also different with respect to financial barriers to medical care ($p=.005$). Subjects with PG were more likely to have delayed seeing a doctor because of insurance or other financial problems ($OR=2.15$, $p=.048$) and were more likely to be unable to pay for medical attention or to have gone into debt due to illness ($OR=3.45$, $p=.002$). Large group differences were observed for utilization of urgent medical care and psychotropic medications ($p<.001$). Subjects with PG were more likely to have at least one emergency department visit in the last year for a physical disorder or mental health/substance use disorder. Subjects with PG were more likely to have 1 hospitalization in the last year for mental health purposes. The groups were similar for hospitalizations for physical health reasons. Subjects with PG were much more likely to be taking psychotropic medications ($OR=8.1$, $p<.001$), with 37% of the PG subjects taking an antidepressant. Significant differences were observed for all classes of psychotropics, with the exception of antipsychotics and “other” (e.g., pregabalin).

Table 4 compares chronic medical conditions of PG and control subjects, with the overall tests revealing significant group differences in both chronic physical ($p<.001$) and mental ($p<.001$) health conditions. Subjects with PG were more likely to be obese ($OR=2.79$, $p=.004$). With the exception of “cancer other than skin cancer” and diabetes, prevalence of other chronic medical conditions was higher in the PG subjects. The largest differences were observed for heartburn/stomach conditions ($OR=4.98$, $p=.001$), headaches ($OR=2.84$, $p=.012$), sleep disorders ($OR=3.14$, $p=.002$), mood/emotional concerns ($OR=9.27$, $p<.001$), anxiety, tension, or stress ($OR=9.01$, $p<.001$), and having a head injury with loss of consciousness ($OR=3.84$, $p=.003$). Subjects with PG were more likely to have 4 of the conditions assessed ($OR=6.80$, $p<.001$).

Table 5 compares the two groups on BMI, number of psychotropic medications, total number of chronic medical conditions, medical outcomes, and quality of life. The overall MANOVA test revealed significant group differences ($p<.001$). For all scales of the SF-36, PG subjects scored lower than control subjects. Compared with controls, PG subjects scored particularly low on Emotional Role, Social Functioning, Mental Summary, and Vitality.

Subjects with PG had a much higher BMI (difference = 3.6, $p = .001$), and had more chronic medical conditions (difference = 2.4, $p < .001$).

Correlations between gambling severity (SOGS, NODS) and medical outcomes including SF-36 subscales were calculated (data not shown). This analysis was restricted to subjects with PG. As gambling severity increased, all measures of medical outcomes worsened, but not all correlations were significant. The most robust correlations were for SF-36 subscales Mental Summary ($r = -0.363$, -0.507), Social Functioning ($r = -0.319$, -0.487), and Emotional Role ($r = -0.376$, -0.398). SOGS total score was positively correlated with total number of chronic medical conditions ($r = 0.211$, $p = .040$).

Discussion

The results show that persons with PG are at increased risk for chronic medical conditions, obesity, increased health service utilization, and poor lifestyle choices, such as avoiding exercise. They also have a worse perception of their health status. Our study adds to the literature by confirming these differences in a well characterized sample of persons with PG and in appropriate controls. Importantly, among pathological gamblers, increasing severity measured with the SOGS and NODS was positively correlated with worse self-reported health perceptions and total number of chronic medical conditions. This work shows that even within this narrowly defined subject group, we are able to demonstrate high risk for adverse medical consequences.

The findings raise questions about the strength and direction of these associations for which there are no ready explanations. Does PG contribute to poor health and obesity, or do persons who are obese and have worse health become pathological gamblers? Gambling could contribute to an inactive lifestyle because it is largely sedentary. The physical setting for gambling may itself contribute to poor health status, for example, sitting for long periods in a smoke filled casino, eating more (or less) frequently than normal, and being offered free or discounted alcoholic beverages.²⁸ These behaviors may be particularly harmful for subsets of pathological gamblers, such as obese persons or the elderly, groups at risk for diabetes, cardiopulmonary disease, or circulatory problems. For example, there is some evidence that the stress of casino gambling can contribute to cardiovascular disease.²⁹ On the other hand, it may be that persons who are obese or in poor health gamble because it is an easy form of recreation for them. It takes little physical ability or stamina to play slots or video poker, and for that reason these games are within reach to persons unable to participate in more physically demanding activities. A remote possibility is that persons with PG are simply more likely to over report medical and physical complaints, yet are otherwise physically healthy. There is some evidence that gamblers tend to somatize so this possibility cannot be entirely discounted, though it does not explain their obesity.^{30,31} Another possibility is that some health-related symptoms could result from gambling withdrawal. Rosenthal and Lesieur³² report that nearly two-thirds of persons with PG experience physical symptoms with abstinence such as headaches, insomnia, upset stomach, and physical weakness.

To be fair, most persons gamble responsibly and do not develop problematic gambling behavior. For these persons, gambling can serve as a community activity that brings people together and fosters social interactions. Desai et al.³³ found that elderly gamblers were healthier than comparable non-gamblers and had better social adjustment. Thus, not all persons who gamble report poor health and lifestyle choices, and a subset of gamblers may actually benefit from the recreational and social nature of gambling. Importantly, Desai et al. were not describing persons with problematic gambling behavior.

There are several important findings to highlight. First, pathological gamblers weigh more than controls and are more likely to be obese. Obesity has become epidemic in the United States,³⁴ and has been associated with many poor health outcomes, including arthritis, diabetes, hypertension, gastroesophageal reflux, and sleep apnea. For that reason, obesity may help explain some of the poor health outcomes reported by pathological gamblers in our sample. The finding is also important because physicians have a responsibility to diagnose obesity and counsel their patients on healthy eating habits, exercise, and weight loss. The high rate of obesity in persons with PG could result from poor lifestyle choices that encourage increased food consumption and a sedentary lifestyle. Pathological gamblers are also more likely to make poorer health-related lifestyle choices, including smoking cigarettes, avoiding exercise, watching television 20 hours/week, and having a high caffeine intake. The fact that the gamblers did not report greater alcohol consumption may have to do with the wording of the questionnaire which asked about recent, not past, drinking behavior ("Do you currently drink any alcohol?").^{10, 35}

Pathological gamblers were more likely to use expensive medical treatments including emergency department visits, hospitalization, and use of computerized tomographic/magnetic resonance imaging scans. This pattern of use may reflect a lack of means to seek regular preventive care, or perhaps that pathological gamblers are underinsured. This is clearly an important yet underappreciated contributor to the overall economic and social cost of PG. Also, persons with PG are less likely to have regular dental care, perhaps because health insurance often does not cover dental care.

Self-reported medical health status and quality of life was impaired in persons with PG, as indicated by results from the SF-36 health survey.³⁶ Pathological gamblers reported impaired physical and emotional role functioning, but also acknowledged bodily pain, impaired social functioning, and low vitality. The findings are in accord with results from an earlier pilot study,³⁷ and from the report of Morasco et al.¹⁴ based on findings from the NESARC sample. The fact that pathological gamblers are obese and report many medical and physical conditions may help explain the SF-36 findings. For example, the impairment in social functioning may stem from the fact that persons with PG are gambling rather than engaging in social activities with family or friends, while the fact that gamblers report low vitality indicates a more general problem with energy and pep. The bodily pain item indicates that the pathological gamblers have more pain complaints than controls that limit their physical activity. Pathological gamblers are much more likely to take psychotropic medications, and their usage is significantly greater than the controls for nearly all categories. This may be explained in part by the considerable psychiatric comorbidity found in persons with PG.¹⁰

There are several methodologic limitations to acknowledge. First, persons with PG were mainly recruited through a study registry, advertising or participation in treatment programs, and not through epidemiologic sampling methods; thus, they may not be representative of persons with PG as a whole. Eleven were recruited from clinical settings (i.e., inpatient or outpatient), and while they were excluded from analyses involving psychotropic usage and medical service utilization, they may have skewed other results. Next, data were largely obtained through self-report, and it is possible that a subject's perception of their medical health and level of physical activity is inaccurate because of denial or exaggeration. For example, people sometimes underestimate their weight, and overestimate their amount of exercise. Nonetheless, research generally supports the accuracy of self-reports of health and levels of exercise.^{38, 39} Pathological gamblers did not report a higher rate of alcohol use, but this was likely a quirk of our questionnaire which did not ask if subjects had a past drinking problem. However, there was some evidence of higher rates of problem drinking as women with PG reported they were more likely to have used alcohol while pregnant. Another

methodological limitation is the large number of outcomes tested, resulting in a higher risk or a Type 1 error. Using MANOVA (for continuous outcomes) and an analogous score test for dichotomous outcomes, we grouped similar outcomes together and then tested the joint (multivariate) significance of differences between PG and controls. Because there were fewer multivariate tests and they all indicated highly significant differences between PG subjects and controls, we believe the grouped outcome results can be generalized to other settings.

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Table 1

Demographic characteristics of PG and Control Subjects

Characteristic	PG (n=95)	Control (n=91)	χ^2 , df	P-value
Female (%)	58%	63%	0.44, 1	.509
Age, mean, years (SD)	45.6 (12.8)	49.4 (16.0)	2.33 [/] , 1	.127
Caucasian (%)	85%	95%	4.33, 1	.038
Occupational status (%)				
Employed	77%	75%	0.11, 1	.736
Unemployed	18%	11%	1.79, 1	.181
Student	17%	9%	2.68, 1	.102
Homemaker	4%	15%	6.64, 1	.010
Retired	9%	21%	4.73, 1	.030
Disabled	21%	5%	9.67, 1	.002
Any children (%)	72%	92%	13.37, 1	<.001
Marital status (%)			FET	<.001
Married	35%	80%		
Divorced/separated	36%	8%		
Widowed	3%	5%		
Single	26%	7%		
Years of school (mean, SD)	14.1 (1.9)	15.2 (2.4)	7.37 [/] , 1	.007

[/] Mann-Whitney Test, FET=Fisher's Exact Test

Table 2

Health-related Lifestyle Choices in persons with PG and Controls

Lifestyle Choice	Prevalence		Adjusted OR (95% CI)	P- value
	PG (n=95)	Control (n=91)		
Score test for overall group difference in healthy lifestyle choices: $\chi^2=28.9$, df=5, p<.001				
Lacks regular exercise	57%	36%	2.38 (1.27, 4.47)	.007
Takes a multi-vitamin	37%	60%	0.55 (0.29, 1.06)	.075
Takes natural remedies	20%	32%	0.66 (0.32, 1.37)	.268
High caffeine intake (≥ 5 servings daily)	28%	9%	4.08 (1.67, 9.94)	.002
Television use (≥ 20 hrs/week)	38%	18%	3.28 (1.49, 7.21)	.003
Score test for overall group difference in unhealthy habits and risky behaviors: $\chi^2=28.9$, df=9, p<.001				
Drinks alcohol	55%	56%	1.04 (0.55, 1.94)	.914
Drink daily	19%	12%	1.53 (0.62, 3.77)	.354
Drank while pregnant ¹	17%	6%	4.88 (1.07, 22.26)	.041
Ever used tobacco consistently	68%	46%	2.43 (1.29, 4.56)	.006
Currently use tobacco consistently	51%	19%	3.70 (1.87, 7.35)	<.001
Smokes ≥ 1 pack/day	29%	5%	6.51 (2.32, 18.24)	<.001
Used tobacco while pregnant ¹	35%	18%	2.12 (0.80, 5.63)	.130
Injected illicit drug	5%	1%		.212 ²
Vehicular accident causing bodily injury	45%	33%	1.68 (0.89, 3.17)	.107

OR=odds ratio, CI=confidence interval,

¹ Only women who were pregnant included in analysis,

² Fisher's Exact Test

Table 3**Health Care Utilization in persons with PG and Controls**

Health Care Utilization	Prevalence		Adjusted OR (95% CI)	P-value
	PG (n=95)	Control (n=91)		
Score test for overall group difference in regular medical care: $\chi^2=19.7$, df=6, p=.003				
Has a primary care physician	83%	89%	1.11 (0.38, 3.22)	.846
Has seen doctor in last year	77%	82%	1.19 (0.48, 2.96)	.702
Dental visits for regular checkups	63%	85%	0.40 (0.19, 0.84)	.015
Has received MRI/brain scan	62%	41%	2.44 (1.31, 4.55)	.005
See any specialists	60%	48%	2.09 (1.10, 3.97)	.024
Has seen specialist in last year	55%	43%	1.97 (1.05, 3.70)	.035
Score test for overall group difference in financial barriers to medical care: $\chi^2=10.7$, df=2, p=.005				
Delayed seeing doctor (insurance/finances)	34%	15%	2.15 (1.01, 4.57)	.048
Unable to pay/debt for physical problem	36%	12%	3.45 (1.57, 7.60)	.002
Score test for overall group difference in urgent medical care: $\chi^2=39.8$, df=8, p<.001				
ED visits since age of 18	87%	69%	2.56 (1.12, 5.86)	.026
ED visits last year	38%	19%	2.40 (1.14, 5.51)	.022
ED visits last year for physical health	38%	19%	2.40 (1.14, 5.51)	.022
ED visits last year for mental health	10%	0%		.002 ²
Hospitalization since age of 18	88%	84%	2.22 (0.79, 6.62)	.155
Hosp. last year	21%	15%	1.52 (0.66, 3.47)	.323
Hosp. last year for physical health	18%	15%	1.25 (0.53, 2.95)	.610
Hosp. last year for mental health	7%	0%		.011 ²
Score test for overall group difference in psychotropic medication usage: $\chi^2=36.9$, df=7, p<.001				
Psychotropic medications				
Any ¹	55%	20%	8.05 (3.65, 17.76)	<.001
Antidepressants	37%	15%	3.92 (1.80, 8.50)	<.001
Mood stabilizers	14%	1%	20.9 (2.56, 171.9)	.005
Benzodiazepines	17%	7%	4.19 (1.43, 12.26)	.009
Sedative/hypnotics	13%	2%	8.43 (1.67, 42.54)	.010
Psychostimulants	8%	2%		.005 ²
Antipsychotics	5%	0%		.051 ²
Other	5%	0%		.051 ²

OR=odds ratio, CI=confidence interval,

¹ Not included in overall score test because outcome is derived from other outcomes,² Fisher's Exact Test, MRI=magnetic resonance imaging

Table 4

Chronic Medical Conditions of PG and Control Subjects

Condition	Prevalence		Adjusted OR (95% CI)	P-value
	PG (n=95)	Control (n=91)		
Score test for overall group difference in chronic physical health conditions: $\chi^2=51.9$, df=16, p<.001				
Obesity	49%	28%	2.79 (1.42, 5.48)	.004
Arthritis/rheumatism	21%	20%	1.69 (0.76, 3.90)	.190
Diabetes	7%	8%	0.94 (0.29, 3.00)	.693
High blood pressure	32%	31%	1.57 (0.75, 3.31)	.211
High cholesterol	22%	15%	2.30 (0.93, 5.70)	.117
Chronic back pain	29%	25%	1.26 (0.64, 2.48)	.470
Asthma/chronic lung disease	17%	10%	2.12 (0.85, 5.32)	.099
Heart disease/coronary heart disease	11%	10%	1.57 (0.53, 4.67)	.401
Heartburn/stomach condition	28%	10%	4.98 (1.97, 12.57)	.001
Enlarged prostate/urinary condition	16%	14%	1.57 (0.65, 3.80)	.299
Headaches	26%	14%	2.84 (1.23, 6.53)	.012
Cancer (other than skin cancer)	8%	11%	0.86 (0.31, 2.40)	.807
Thyroid disease	16%	12%	1.99 (0.80, 4.99)	.133
Low sex drive	11%	4%	2.89 (0.83, 10.04)	.089
Sleep disorders	37%	18%	3.14 (1.52, 6.52)	.002
Head injury with loss of consciousness	25%	9%	3.84 (1.56, 9.44)	.003
Score test for overall group difference in chronic mental health conditions: $\chi^2=60.8$, df=2, p<.001				
Mood/emotional concerns	64%	24%	9.27 (4.36, 19.71)	<.001
Anxiety, tension, or stress	49%	15%	9.01 (4.01, 20.23)	<.001
4 conditions ²	66%	36%	6.80 (3.14, 14.71)	<.001
Unemployed for health reasons ^{1, 2}	50%	40%	2.07 (0.38, 11.22)	.400

OR=odds ratio, CI=confidence interval, SD=standard deviation

¹ Analysis restricted to subjects who are unemployed,² Not included in overall score test.

Table 5

Quality of Life Measures for PG and Control Subjects

Measure	Mean (SD)		Adjusted Diff. (95% CI)	P-value
	PG (n=95)	Control (n=91)		
MANOVA test for overall group difference in quality of life measures: F=6.69; df=12, 143; p<.001				
BMI	31.5 (8.4)	27.9 (5.4)	3.6 (1.4, 5.8)	.001
Number of psychotropics ¹	1.1 (1.4)	0.3 (0.7)	0.9 (0.6, 1.2)	<.001 ²
Number of chronic conditions ²	4.7 (2.9)	2.8 (2.4)	2.3 (1.6, 3.1)	<.001
SF-36 Results				
Physical Functioning	73.5 (27.0)	84.3 (22.0)	−10.9 (−17.9, −3.9)	.002
Physical Role	69.9 (38.7)	77.0 (35.6)	−6.3 (−17.9, −5.2)	.273
Emotional Role	61.3 (44.6)	87.6 (26.8)	−25.8 (−37.4, −14.2)	<.001
Vitality	45.1 (20.1)	60.9 (17.5)	−16.2 (−22.1, −10.4)	<.001
Mental Health	60.1 (20.9)	78.4 (12.8)	−17.8 (−23.1, −12.4)	<.001
Social Functioning	68.1 (29.9)	88.2 (18.7)	−20.3 (−27.9, −12.6)	<.001
Bodily Pain	66.1 (28.3)	75.3 (23.8)	−9.7 (−17.7, −1.7)	.016
General Health	56.5 (21.4)	73.0 (19.3)	−16.8 (−23.2, −10.3)	<.001
Physical Summary ³	67.2 (23.8)	78.0 (21.2)	−10.6 (−17.5, −3.8)	.002
Mental Summary ³	59.0 (25.2)	79.2 (14.2)	−20.7 (−27.0, −14.4)	<.001

¹Psychotropics from Table 3,²Chronic Medical Conditions from Table 4,³Not included in MANOVA test because outcome is derived from other outcomes, CI=confidence interval