Rollin et al., J Food Nutr Disor 2017, 6:5
DOI: 10.4172/2324-9323.1000238

Journal of Food & Nutritional Disorders

Research Article

A SCITECHNOL JOURNAL

Prevalence of Overweight and Eating Disorder Risk of Hospital Night Staff at Rouen University Hospital

Laetitia Rollin[1], Eric Pascal[1], Sébastien Grigioni[2], Pierre Dechelotte[2], Jean-François Gehanno[1] and Vanessa Folope[2]

Abstract

Introduction: Night shift work can disturb the biological rhythm of employees and can lead to sleep digestive and nutritional disorders as well as onset of overweight. We studied the prevalence of nutritional disorders among the night shift staff of a university hospital.

Methods: Staff were proposed an anonymous questionnaire including items on: socio-demographics, physical activity, nutrition (BMI, snacking, hyperphagia, weight change with duration of night shift and screening risk of eating disorder (ED) with F-SCOFF questionnaire); sleepiness (EPWORTH questionnaire); and smoking status.

Results: Four hundred and nineteen (57.4%) night shift workers answered the questionnaire. More 90% were women and nearly half of them were nurses (47%). One hundred and forty-six (36.6%) had weight excess and 15.8% (n=66) were suspected to have an ED. One out of five workers (16.9%, n=70) had an EPWORTH score in with risk of hypersomnia. Multivariable logistic regression analysis found factors significantly associated with suspected ED: high EPWORTH score (aOR=3.94, 95% CI [1.91, 8.13]), weight gain in night staff (aOR=3.40, 95% CI [1.60, 7.21]), overweight (aOR=2.04, 95% CI [1.06-3.94]), dieting (aOR=3.38, 95% CI [1.74, 6.55]), and hyperphagia (aOR=3.74, 95% CI [1.55, 9.00]). At least one third of workers were interested in dietary counseling (n=38.2%).

Conclusion: Overweight and ED are frequent in night shift workers, which underlines the need for specialized intervention.

Keywords

Eating disorder; Hospital worker; Night shift work; Obesity; Overweight; Public sector

Introduction

The implementation of night work in a company is needed for the continuity of economic activity or social utility such as continuity of care in a hospital environment. Yet, one fifth of the French population are night shift workers [1].

Previous studies have identified many adverse health effects associated with long-term shift work. A recent review by the French Occupational Medicine Society reported that shift work and night work were associated with cardiovascular disease, obesity and metabolic disorders, sleep disorders, gastrointestinal disease, psychological disorders like anxiety and depression, and several types of cancer [2]. Systematic analysis of the literature on obesity and metabolic disorders [2-6] highlight a positive association between shift work and/or night work and weight gain, leading to risk of metabolic syndrome [7,8]. This weight gain has been linked to either inadequate behavior, or eating disorders (ED) or both. Recent studies have reported changes in the quantity and quality of meal composition [3,4,9] changes in food selection according to work shift [6] or changes in meal schedules [2].

A study in a Hong Kong hospital [10] had shown that a high proportion of nurses had abnormal eating behaviors. They also reported that shift work was associated with abnormal emotional behavior, which involves eating in response to emotional arousal states like

fear, anger or anxiety, and restraint in eating behavior. Two recent French studies [11,12] have revealed a lack of uniformity in hospital workers' food habits as well as a lack of impetus for nutritional or dietary follow-up to prevent negative health effects in night shift staff.

Therefore, the present study aimed to assess the prevalence of nutritional disorders (weight gain, obesity and eating disorders [ED]) in night staff at Rouen University Hospital (RUH), France, and to identify factors associated with ED to propose specific help and care if needed.

Methods

We distributed an individual short anonymous questionnaire to RUH night shift staff between March 17th 2014 and April 18th 2014. The questionnaire consisted of items on socio-demographics, work and clinical information. These included participants' age, gender, profession, working hours, personal decision to work night shift (is it a personal choice to work at night? Answer with a Likert scale 4 levels : not at all, rather no, rather yes, yes quite, in which cutoff was made later between rather no and rather yes), social impact, anthropometric data (current weight, height, BMI, weight before starting working at night, weight gain was a variable secondly calculated and was positive if the maximum weight reported during night shift work was higher than the weight before starting night shift work), physical activity and frequency by week, eating behaviors (type of beverage consumed during night work, tachyphagia if meals were taken under 20 minutes, snacking : do you nibble? Yes or no, hyperphagia if patient usually serve himself again and feel eating high quantities, current diet), medication for obesity comorbidities and smoking status, sleep quality (EPWORTH), and risk of eating behavior (F-SCOFF). Finally, we proposed to night shift workers to benefit from a follow-up in the occupational health service in the hospital. All the items were pilot-tested and evaluated for face validity by a panel of staff specialists and public health physicians.

Screening tools

SCOFF is a screening questionnaire for ED developed by J.F. Morgan et al. [13]. It is considered to be a standard screening tool for ED. It is an easy, short and reproducible questionnaire, including

***Corresponding author:** Laetitia Rollin, Occupational Medicine Service, Rouen University Hospital, 1 rue de Germont, 76031 Rouen cedex, France, Tel: (33) 2 32 88 82 85; Fax: (33) 2 32 88 09 57; E-mail: laetitia.rollin@chu-rouen.fr

Received: October 11, 2017 **Accepted:** November 13, 2017 **Published:** November 17, 2017

5 dichotomous items. The threshold value of two or more positive answers (which corresponds to a positive SCOFF) was established to obtain the best sensitivity/specificity ratio [13-15]. Translated and validated in many languages in the world, the current French Version (F-SCOFF) used in our study, has been developed and validated both in high risk populations [16] and clinical populations [17].

The EPWORTH Sleepiness Scale (ESS) is a self-administered questionnaire developed to detect sleep disorders [18]. The evaluation is carried out through 8 items rated from 0 to 3 relative to situations of everyday life and considers the threshold value of a score of at least nine. This test is usually used in screening for obstructive sleep apnea syndrome (OSAS), but also in idiopathic insomnia or in different causes of hypersomnia. The French version has been translated and validated [19].

Population of the survey

We studied night shift staff at RUH. This survey was designed to target all the represented professional categories working on night shift in our hospital, i.e. nurses, health-care workers and auxiliary nurses. Night workers were located on the five different sites of the RUH. Questionnaires were given by hand directly to the workers on several successive night shifts or sent by surface mail in the wards.

Statistical analysis

Analysis was performed with SPSS statistical software. A descriptive analysis of all variables was performed and presented with their numbers and frequencies for the observed conditions. Given the large size of the sample, parametric tests were most often used: Student's t test to compare quantitative variables between two groups and Pearson X^2 test to compare quantitative variables. The nonparametric Fisher exact test was used to compare two variables when the subsample was small (n<5). All tests were two-tailed tests. Variables with p-value <0.01 were included in a multivariable logistic regression analysis to identify independent risk factors. The results were presented as adjusted odds ratio with 95% confidence intervals.

Results

Of the 730 questionnaires distributed overall in the hospital, we received 419 questionnaires representing a response rate of 57.4%.

Sociodemographic and occupational data

Among the 419 workers, mostly were female (92.2%; n=378). Nurses and auxiliary nurses, were the most represented occupational categories (respectively n=198 or 47.4% and n=183 or 43.8%). For the vast majority of workers, night shift work was a personal decision (94.9%; n=394). On average, night shift staff had worked 7 years at night during their career. More than half of staff did not spontaneously report any disturbance in their behavior in social and family life during night work (59.3%; n=242). Nurses made up most part-time staff. All results are presented in Table 1.

Health data

A quarter of night shift staff (24.8 %, n=99) were overweight (25 ≤ BMI<30) and 11.8% (n=47) were obese (BMI ≥ 30). Grade I obesity (BMI 30-34.9 kg/m²) was the most represented (7.5%; n=30) (Table 2). Weight gain was measured as the difference between the maximum weight reported during night shift work and weight before starting night shift work. The average weight gain over the entire survey population was 4.2 kg. Among night shift workers who gained weight (n=231), mean weight gain was assessed at 8.02 kg and, conversely, a loss of 1.22 kg was observed in the other part of the population (n=132).

Analysis of night workers' eating behavior revealed that one out of six workers were suspected to have ED according to F-SCOFF (F-SCOFF≥ 2; 15.8%; n=66). Almost half of night shift staff (49.4%; n=205) reported tachyphagia. More than half had hyperphagia (68.1%; n=282) and three quarters snacked (74.4%; n=308). Beverages most widely consumed by night shift workers at night on regular basis, were coffee and tea: 247 (59.2%) and 161 night shift workers (38.6%) respectively. A quarter (23%; n=95) of night shift workers reported they were on a diet. Among these, 6.9% (n=29) had consulted a dietitian or a nutritionist, 10% (n=42) were on a self-managed diet, 3.6% (n=15) were on a Weight Watchers® program and 1.7% (n=7) were on another type of diet (non-specified).

Very few night shift workers took medication for obesity and night shift work comorbidities such as: diabetes (1.4%; n=6), hypertension (6.5%; n=27), high cholesterol level (3.3%; n=14), or digestive disorders (7.7%; n=32). Some night shift workers took medicine to sleep (6.9%; n=29), to manage anxiety (4.8%; n=20) or had a device for a sleep apnea syndrome (1.2%; n=5). The EPWORTH score was positive for 16.9% (n=70) of night workers.

Active smokers accounted for 29.7% (n=124) of our population. Regular physical activity was declared by 57.8% of workers (n=241)

Table 1: Sociodemographic and occupational data.

Characteristics	Categories	n	%
Age (Years)			
	18-24	24	6
	25-34	96	23
	34-44	142	34
	45-54	122	30
	55-64	31	7
	missing	3	
Sex			
	Male	32	8
	Female	370	92
	missing	8	
Working status			
	Nurse	198	47
	Nurse aide	183	44
	Other (midwife, cleaner operative, manager).	37	9
Working time			
	Full time	280	67.2
	Part time missing	137 2	32.8
Disturbance in the social and family life			
	Yes, completely	43	11
	Mostly yes	123	30
	Mostly no	108	26
	Not at all	134	33
	missing	10	
Night Work choice			
	yes	394	95
	No	21	5
	missing	3	

Table 2: Night worker population data.

Characteristics	Categories	n	%
BMI (kg/m²)			
	<18	9	2
	18<BMI<25	245	61
	25 ≤ BMI<30	99	25
	30 ≤ BMI<35	30	7
	35 ≤ BMI<40	10	3
	BMI>40	7	2
	missing	18	
Physical activity Yes/No			
	Yes	241	58
	No	42.1	42
	missing	1	
Frequency of physical activity (a week)			
	<1	26	6
	1	101	25
	2	94	23
	>3	16	4
	missing	4	
Beverage consumption during night work			
	Coffee	247	60
	Tea	161	40
	missing	10	

with one or two sport periods by week. Main activities performed included walking and water sports in equal proportion (25%). All results are summarized in Table 2.

Interest of workers for nutritional and/or dietary follow-up

About a third of night workers (38%; n=155) showed interest in a nutritional follow-up in the occupational health department.

Factors associated with suspected ED (Tables 3 and 4)

Our results showed that being a nurse (p=0.025) and having chosen night work (p=0.023) were significantly associated with a lower risk of being suspected of having ED. In contrast, feeling of disturbed family and social life induced by night work was associated with an increased risk of being suspected of having ED (p=0.027). Risk of excessive sleepiness (p=0.001), being overweight or obese (p=0.001) and undergoing weight gain during night work (p=0.001) was also associated. Some dietary behaviors such as overeating (p=0.001) and diet in progress (p=0.001) were significantly associated with being suspected of having ED. We did not find a significant association between positive F-SCOFF score and regular physical activity practice, smoking, gender, diabetes, hypertension and anxiety symptoms. Snacking or tachyphagia were not associated with being suspected of having ED. The multivariable logistic regression model (Table 4) incorporated variables with p-value <0.1: weight gain, being overweight, smoking status, anxiety, snacking, choosing to work night shift, impact of night shift work on social and family life, hyperphagia, current diet, professional nursing status and positive EPWORTH score. Factors significantly associated with being suspected of having ED were: positive EPWORTH score, weight gained during night work period, overweight, dieting, and hyperphagia. However being a nurse appeared to be a protective professional factor against ED.

Discussion

In this single sample of 419 night shift workers, the prevalence of being overweight or obese was lower than the French adult obesity rates (respectively 32.3% and 15%) [20], but was similar to French healthcare workers (respectively 23.7% and 10.9%) [21]. Moreover, our local results were lower than the prevalence of obesity in the general population of Upper Normandy region estimated at 19.6%. This could be partially explained by a strong rate of active smoking

Table 3: Factors associated with a risk of Eating Disorder.

Variables	Positive **SCOFF**	*p*
Sex		1
female(n=377)	18.2%	
Male (n=32)	18.5%	
Working status		0.025
Nurses (n=198)	11.6%	
Other(health-care workers, midwife, childcare assistant, manager) (n=219)	24.4%	
Decision to work night shift		0.023
Yes(n=393)	14.7%	
No (n=21)	33.3%	
Disturbed social and family life		0.027
Yes(n=166)	21.1%	
No(n=241)	12.8%	
Smoking status		0.1
Current smoker (n=123)	11.4%	
Non-smoker (n=294)	17.7%	
Physical activity		0.25
Yes (n=241)	14.1%	
No(n= 175)	18.3%	
Hypertension		0.78
Yes (n=27)	11.1%	
No(n= 390)	16.2%	
Type 2 diabetes		0.59
Yes (n= 6)	0%	
No(n= 411)	16%	
Anxiety		0.07
Yes (n= 20)	30%	
No(n=397)	15.1%	
Positve EPWORTH		<0.001
Yes(n=70)	34.3%	
No(n=397)	12.2%	
Weight gain		<0.001
Yes(n=230)	22.6%	
No(n=162)	8%	
Overweight		<0.001
Yes(n=146)	26%	
No(n=253)	10.7%	
Tachyphagia		0.18
Yes(n=205)	18%	
No(n=210)	13.3%	
Snacking		0.09
Yes(n=308)	17.2%	
No(n=106)	10.4%	
Hyperphagia		<0.001
Yes(n=282)	20.2%	
No(n=132)	6%	
Current diet		<0.001
Yes(n=95)	31.6%	
No(n=321)	11%	

Table 4: Factors associated with risk of Eating Disorder: multivariate model.

Variables	Adjusted odds ratios [95% confidence intervals]	*p*
Weight gain	3.25 [1.5 -7.01]	0.003
Overweight	2.04 [1.06-3.94]	0.03
Positive EPWORTH score	2.91 [1.50-5.69]	0.002
Decision to work nights	0.39 [0.11-1.36]	0.14
Disturbed social and family life	1.27 [0.65-2.47]	0.48
Hyperphagia	3.12 [1.61-6.04]	0.001
Current diet	4.45 [2.25-8.8]	0.001
Nurse	0.27 [0.14-0.55]	0.001
Smoking	0.7 [0.33-1.64]	0.46
Anxiety	1.4 [0.4-5.4]	0.56
Snacking	1.59 [0.76-3.3]	0.22

(29.7%) [22-24] and by a widely present physical activity (57.8 %). We cannot rule out a healthy worker effect that could contribute to these results: since night work was a personal decision for 95% of the population which answered our questionnaire, we cannot exclude that less healthy people did not choose to work at night or that people whose health was affected by night work left it. Another bias could be linked to the fact that 43% of the healthcare workers in the department we studied did not participate. We have no possibility to assess if they had more or less suspected ED than those who answered. However, a response rate of 57% is quite high for questionnaire studies in a working population. This present study has shown that a high proportion of hospital night shift workers have abnormal eating behaviors and has demonstrated a significant relationship between suspected ED and being on a diet (aOR=3.58; 95% CI [1.74-6.55]; p<0.001). It is not surprising to find this result considering that being on diet can lead to food compulsions especially in cases of food restriction [25]. Moreover we noticed that 10% of our studied populations were on self-managed diets without medical supervision. A third of night shift workers were interested in regular follow-up by occupational medicine staff. These results emphasize that night shift workers are concerned about the effects of night shift work on their health. This tendency is confirmed by the high rate of participation and by the positive answer for dietary advice in two hospital French studies [11,12].

The relations between eating habits and shift work have been the subject of different studies. A previous studies in the United Kingdom [26], showed that nurses consumed more snacks during night duty in order to keep themselves awake and energy due to heavy workload and long shifts. Similar results have been reported in Brest University Hospital: most night shift workers (72.8%) had meals during night (at least one a night) [11]. It is well known that hyperphagia is significantly associated with ED, because it is one of the semiological characteristics of bulimic hyperphagia. We underline however that it is a subjective variable, based on personal estimation of quantities of ingested food and eating habits (Do you utablesually serve yourself again?). We did not find, in the literature, a validated questionnaire allowing an objective evaluation of hyperphagia. Indeed, Weinstein et al. [27] showed, in a young population (18-35 years), different eating habits between men and women: during stressful situations women ate more than usually. Weight gain is also significantly associated with suspected ED. It could be due to poor diet or poor eating habits leading to eating disorders.

Conversely, our results highlight the fact that nurses were less at risk of having suspected ED (aOR=0.29) than other workers groups. For practical reasons of statistical analysis, we did not differentiate the different nursing specialties (ward nurse, operating room nurse; nurse anesthetist etc.). We can presume that training could explain this point: nurses have detailed trainings about nutrition whereas nurses aids which represents 83% of the other group have not such a detailed training. Besides, no significant association was found between working status and frequency of night meals, in the literature [12,14].

By comparison with the general population, in which it is estimated that 22% have an Epworth score >10, prevalence of hypersomnia is weakly represented in our night staff since we found 16.9% having a Epworth score of nine and more [28]. This could be explained on the one side by the weaker rate of obesity in our population and therefore the small proportion of people treated for sleep apnea syndrome, and on the other side by a healthy worker effect since shift work is a known risk factor for hypersomnia, which can in turn lead to exclusion from shift work. Indeed, only 1.5% (n=5) of night shift workers used a continuous positive airway pressure device at night. Hypersomnia was significantly associated with suspected ED (aOR=3.94).

Our population was mainly made of women, distributed according to two main hospital professions (nurses and health-care workers) usually widely female-dominant [29]. The overall response rate of 57.4%, hospital wide was most satisfactory with regard to similar previous studies [11,12] and could be explained by the large number of questionnaires delivered personally, by ourselves, to night shift workers. For the vast majority of staff, night work represents a professional choice (94.9%). This motivation could be financial or to suit the family. Shift duties might particularly affect female night shift workers with children, whom may need to balance parenting duties with employment. High frequencies of shift work could potentially conflict with daily schedules of domestic roles and duties [30,31] In our study, more than half (59.3%) of night shift workers reported no disturbance in their social or family life. Furthermore, the majority of hospital night shift staff worked full time. One third of night shift workers, whether nurses or health-care workers, resorted to part-time work, resulting in difference of comparison with national results in which they are 19% [1,32]. It is likely that the female night shift workers in our study were not disturbed in their social or family life, because they chose to work part-time.

To our knowledge, this is the first study has clearly evaluated the association between night shift work and risk of eating disorders in hospital workers. Nevertheless, our study has several limitations such as the “healthy worker effect”: presence on night shifts decreases with age. Some variables like height and weight were self-reported which corresponds to a risk of reporting and memorization bias. But there is evidence in the literature to support use of self-reported height and weight. Indeed, self-reporting and technician measured reporting are highly correlated [33-35]. Requiring measurement of height and weight via questionnaire may have severely limited participation by night shift workers. Some potential confounders could not be taken into account, such as weight gain during pregnancy, peer influence, participants’ stress levels and the presence of chronic diseases which require dietary control. Nevertheless, a positive association has already been demonstrated between working at least four nights a month and abnormal eating habits under the influence of stress [10].

Several recent studies in young subject [36]. especially in health care students [37] have reported a high risk of ED, especially non-medical health professionals. Multivariate analysis in these studies

[36,37] highlighted the close correlation of ED with a high level of perceived stress, sleep disturbance, disorganized eating habits and other addictive behaviors. Conjunction of elevated stress, sleep deprivation and altered eating pattern is likely to explain the risk of ED in night shift workers.

Conclusion

The prevalence of suspected ED was studied for the first time, with a validated questionnaire and for more than 15% of RUH night workers. Suspected ED seems to be associated with weight gain during night work, being on a diet, hyperphagia, and hypersomnia. We found a prevalence of excess weight which was similar to data in the literature on hospital populations.

Similar hospital studies would be interesting to enhance generalizability and compare with day workers' eating habits. Health promotion strategies and occupational monitoring are currently being tested to secure the optimal dietary habits of Rouen University Hospital staff.

Acknowledgments

The authors thank Nikki Sabourin-Gibbs, Rouen University Hospital for review of the manuscript in English.

References

1. INSEE (2012) Employment survey, duration and working conditions of French employees.
2. French Society of Occupational Medicine (2012) Medico-professional surveillance of posted workers and/or night workers. Recommendations for clinical practice. Label HAS.
3. Balieiro LCT, Rossato LT, Waterhouse J, Paim SL, Mota MC, et al. (2014) Nutritional status and eating habits of bus drivers during the day and night. Chronobiol Int 31:1123-1129.
4. Amani R, Gill T (2013) Shiftworking, nutrition and obesity: implications for workforce health- a systematic review. Asia Pac J Clin Nutr 22: 505-515.
5. Van Drongelen A, Boot CRL, Merkus SL, Smid T, van der Beek AJ (2011) The effects of shift work on body weight change - a systematic review of longitudinal studies. Scand J Work Environ Health 37: 263-275.
6. Antunes LC, Levandovski R, Dantas G, Caumo W, Hidalgo MP (2010) Obesity and shift work: chronobiological aspects. Nutr Res Rev 23: 155-168.
7. Pietroiusti A, Neri A, Somma G, Coppeta L, Iavicoli I, et al. (2010) Incidence of metabolic syndrome among night-shift healthcare workers. Occup Environ Med 67: 54-57.
8. Wang F, Zhang L, Zhang Y, Zhang B, He Y, et al. (2014) Meta-analysis on night shift work and risk of metabolic syndrome. Obes Rev 15: 709-720.
9. Morikawa Y, Miura K, Sasaki S, Yoshita K, Yoneyama S, et al. (2008) Evaluation of the effects of shift work on nutrient intake: a cross-sectional study. J Occup Health 50: 270-278.
10. Wong H, Wong MCS, Wong SYS, Lee A (2010) The association between shift duty and abnormal eating behavior among nurses working in a major hospital: a cross-sectional study. Int J Nurs Stud 47: 1021-1027.
11. AppereV, Lodde B, Garlantezec R, Carpentier M, Delarue J, et al. (2012) Survey of the eating behavior of night hospital staff at Brest University Hospital Center. Arch Mal Prof Environ 73: 885-895.
12. Berthier C. Survey of the dietary pattern of night staff in a hospital.
13. Morgan JF, Reid F, Lacey JH (1999) The SCOFF questionnaire: assessment of a new screening tool for eating disorders. BMJ 319: 1467-1468.
14. Hill LS, Reid F, Morgan JF, Lacey JH (2010) SCOFF, the development of an eating disorder screening questionnaire. Int J Eat Disord 43: 344-351.
15. Luck AJ, Morgan JF, Reid F, O'Brien A, Brunton J, et al. (2002)The SCOFF questionnaire and clinical interview for eating disorders in general practice: comparative study. BMJ 325: 755-756.
16. Garcia FD, Grigioni S, Chelali S, Meyrignac G, Thibaut F, et al. (2010) Validation of the French version of SCOFF questionnaire for screening of eating disorders among adults. World J Biol Psychiatry 11: 888-893.
17. Garcia FD, Grigioni S, Allais E, Houy-Durand E, Thibaut F, et al. (2011) Detection of eating disorders in patients: validity and reliability of the French version of the SCOFF questionnaire. Clin Nutr 30: 178-181.
18. Johns MW (1991) A new method for measuring daytime sleepiness: the Epworth sleepiness scale. Sleep 14: 540-545.
19. Kaminska M, Jobin V, Mayer P, Amyot R, Perraton-Brillon M, et al. (2010) The Epworth Sleepiness Scale: self-administration versus administration by the physician, and validation of a French version. Can Respir J 17: e27-e34.
20. INSERM/KANTAR HEALTH/ROCHE (2012) National Epidemiological Survey of Overweight and Obesity.
21. National descriptive report 2012-2013. (2014) Evolutions and Relationships in Occupational Health (evrest).
22. Chen H, Saad S, Sandow SL, Bertrand PP (2012) Cigarette smoking and brain regulation of energy homeostasis. Front Pharmacol 3: 147.
23. Fulkerson JA, French SA (2003) Cigarette smoking for weight loss or control among adolescents: gender and racial/ethnic differences. J Adolesc Health 32: 306-313.
24. Pistelli F, Aquilini F, Carrozzi L (2009) Weight gain after smoking cessation. Monaldi Arch. Chest Dis 71: 81-87.
25. Holmes M, Fuller-Tyszkiewicz M, Skouteris H, Broadbent J (2014) Improving prediction of binge episodes by modelling chronicity of dietary restriction. Eur Eat Disord Rev 22: 405-411.
26. Faugier J, Lancaster J, Pickles D, Dobson K (2001) Barriers to healthy eating in the nursing profession: Part 1. Nurs Stand 15: 33-36.
27. Weinstein SE, Shide DJ, Rolls BJ (1997) Changes in food intake in response to stress in men and women: psychological factors. Appetite 28: 7-18.
28. Leger D, Vecchierini MF, Metlaine A, Philip P, Adrien J, et al. (2012) Drowsiness on a daily basis in France: associated factors and consequences. Survey of the National Institute of Sleep and Vigilance (INSV-MGEN 2011). BEH 44: 502-509.
29. Daniel SICART (2014) Health professions. Directorate of Research, Studies, Evaluation and Statistics (DREES). Statistical series. N˚189.
30. Beermann B, Nachreiner F (1995) Working shifts-different effects for women and men? Work Stress 9: 289-297.
31. Night work: impact on the working and living conditions of employees. Opinions and reports of the Economic, Social and Environmental Council.
32. Mathilde Pak (2013) Part-time work. Synthese. Stat. Direction of the animation of research, studies and statistics.
33. Connor Gorber S, Tremblay M, Moher D, Gorber B (2007) A comparison of direct vs. self-report measures for assessing height, weight and body mass index: a systematic review. Obes Rev 8: 307-326.
34. Lawlor DA, Bedford C, Taylor M, Ebrahim S (2002) Agreement between measured and self-reported weight in older women. Results from the British Women's Heart and Health Study. Age Ageing 31: 169-174.
35. McAdams MA, Van Dam RM, Hu FB (2007) Comparison of self-reported and measured BMI as correlates of disease markers in US adults. Obesity (Silver Spring) 15: 188-196.
36. Tavolacci MP, Ladner J, Grigioni S, Richard L, Villet H, et al. (2013) Prevalence and association of perceived stress, substance use and behavioral addictions: a cross-sectional study among university students in France, 2009-2011. BMC Public Health 13: 724.
37. Tavolacci MP, Grigioni S, Richard L, Meyrignac G, Dechelotte P, et al. (2015) Eating Disorders and Associated Health Risks Among University Students. J Nutr Educ Behav 47: 412-420.

Author Affiliation Top

[1]*Service of Occupational Medicine - Rouen University Hospital, Rouen, France*
[2]*Clinical Nutrition Unit-CHU Rouen, Rouen, France*