Eating disorders: Prevalence and associated factors among health occupation students in Monastir University (Tunisia).

Désordres du comportement alimentaire chez les étudiants en Sciences de la Santé à l'Université de Monastir (Tunisie)

تناول اضطرابات السلوك لدى طلاب العلوم الصحية بجامعة المنستير (تونس)

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RÉSUMÉ

Contexte: Malgré leur forte prévalence et leur gravité chez les jeunes, les recherches à l'échelle nationale concernant les désordres des comportements alimentaires chez les étudiants universitaires sont rares. Par conséquent, il est impératif d'identifier l'ampleur et les facteurs associés à ces troubles permettant de mettre en place des interventions efficaces.

Objectif: Déterminer la prévalence et les facteurs associés aux désordres de comportements alimentaires chez les étudiants en sciences de la santé à l'université de Monastir en 2013.

Méthodes: Il s'agit d'une étude transversale au cours de laquelle un questionnaire auto-administré a été distribué en s'adressant directement aux étudiants. Les items suivants ont été collectés: caractéristiques démographiques, socioéconomiques, et éducationnelles, estime de soi, suivi de régime alimentaire antérieur, stress perçu (échelle de Cohen), dépression (inventaire de dépression de Beck), qualité de sommeil, cyber addiction (échelle d'Orman), usage régulier d'alcool (questionnaire CRAFT ADOPSA). Le questionnaire de SCOFF a été utilisé afin d'identifier les étudiants à risque de troubles du comportement alimentaire.

Résultats: Un total de 974 étudiants a été inclus (âge moyen: 22,8 ans± 2,2 ; sex ratio: 0,43). La prévalence de troubles alimentaires a été de 35,4%; IC 95% [32,0-38,5]. Ce trouble a été plus important chez les étudiants de sexe féminin (39,8%; IC 95% [35,8-43,7]) que ceux de sexe masculin (24,3%; IC 95 % [18,8-29,7]) avec une différence statistiquement significative (p<10-3). Les facteurs de risque associés aux troubles alimentaires ont été le "suivi de régime alimentaire antérieur" (OR ajusté = 4,13 ; IC 95% [2,79-6,12]), le "sexe féminin" (OR ajusté = 1,77; IC 95 % [1,13-2,77]) et le "non redoublement" (OR ajusté = 1,76; IC 95 % [1,09-2,85]).

Conclusion: La prévalence des troubles du comportement alimentaire chez les étudiants en sciences de la santé a été. Ces résultats soulignent la nécessité de politiques diversifiées et adaptées de prévention et d'éducation pour la santé, ainsi que la nécessité d'un dépistage systématique de ces troubles alimentaires chez les étudiants afin de commencer un traitement précoce pouvant améliorer leur pronostic.

Mots clés : Troubles du comportement alimentaire, Etudiants profession médicale ou paramédicale, Etudiants Médecine, Etudiants Médecine Dentaire, Etudiants Pharmacie, Prévalence, Facteurs de risque, Régression logistique, Questionnaire, Tunisie

SUMMARY

Background: Despite their high prevalence and severity among youth, national researches concerning eating disordered behavior among undergraduate students remains rare. Hence, it is imperative to determine the amplitude and to identify the risk factors of eating disorders (ED) to enable effective interventions.

Aim: To assess prevalence and associated factors of (ED) among health occupation students in the university of Monastir during 2013.

Methods: A cross sectional study using a self-administered questionnaire which was distributed by approaching directly students. The following items were collected: demographic, socioeconomic and educational characteristics; self-esteem; previous dieting; perceived stress score(Cohen's scale); depression (Beck Depression); sleep quality; sport practice; cyber addiction (Orman scale) and alcohol regular use (CRAFT-ADOPSA questionnaire). SCOFF questionnaire was used to identify students at risk of ED.

Results: A total of 974 students were included in the study. The mean age of students was 22.8 (Standard Deviation=2.2) with a sex ratio of 0.43. The prevalence of ED according to SCOFF questionnaire was 35%; 95% CI [32.0-38.5]. It was higher among female (39.8; 95% CI [35.8-43.7]) compared to male (24.3; 95% CI [18.8-29.7]) with a statistically significant difference (p<10-3). The risk factors associated independently with an eating disorder were "Previous dieting" (aOR=4.13; 95% CI [2.79-6.12]),"Sex" (aOR=1.77. 95% CI [1.13-2.77]) and "Repeat a year" (aOR=1.76; 95% CI [1.09-2.85]).

Conclusion: The prevalence of health occupation students at risk of ED was high. These results emphasizes the need for diversified and adapted prevention and health education policies as well as a need for a systematic screening of ED among students in order to start an early treatment that can improve their prognosis.

Keywords: Feeding and Eating Disorders - Students, Health Occupations -Students, medicine -Students, Dentistry -Students, Pharmacy –Prevalence -Risk factors - Logistic Models –Questionnaire -Tunisia

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ملخّص

تناول اضطرابات السلوك لدى طلاب العلوم الصحية بجامعة المنستير (تونس)

المقدّمة: على الرغم من ارتفاع انتشارها وخطورتها بين الشباب تظل الأبحاث نادرة حول اضطرابات الأكل على الصعيد الوطني بين طلاب المرحلة الجامعية وبالتالي وجب تحديد مدى انتشار هذه الاضطرابات و العوامل المرتبطة بها بهدف تمكين التدخلات الفعالة.

الهدف: قياس معدل انتشار اضطرابات الأكل و تحديد العوامل المرتبطة بها بين طلاب علوم الصحة بجامعة المنستير خلال سنة 2013 .

الطرق: دراسة مقطعية تم خلالها توزيع استبيان ذاتي عن طريق الاتصال المباشر بالطلاب لجمع البنود التالية: الخصائص الديمغرافية، والاجتماعية الاقتصادية و الاجتماعية ، تقدير الذات حمية غذائية، التوتر المرضي (سلّم Cohen)، الاكتئاب (قائمة Beck)، جودة النوم، إدمان الأنترنت (سلّم Orman)والكحول (سلّم CRAFT ADOPSA) و استخدم استبيان SCOFF للتعرّف على الطلاّب المعرّضين لخطر اضطرابات الأكل.

النتائج: كان مجموع المشاركين في هذه الدراسة 974 طالبا (متوسّط العمر: 22,8 ± 2,2 سنة، نسبة الجنس = 0,43) . بلغت نسبة اضطرابات الأكل 35,4 % [32,0 - 38,5] و كانت أعلى بين الطالبات (39,8% [43,7-35,8]) منها بين الطلاب 24,3% [29,7-18,8] مع وجود فرق ذي دلالة إحصائية و كانت العوامل المرتبطة باضطرابات الأكل كالتالي : إتّباع حمية غذائية (نسبة الأرجحية = 4,13 [6,12-2,79])، جنس الإناث (نسبة الأرجحية = 1,77 [2,77-1,13]) و الرسوب الجامعي (نسبة الأرجحية =1,76- [2,85-1,09] .

الخلاصة: كان معدل انتشار اضطرابات الأكل عند طلاب علوم الصحة مرتفعا. تؤكد هذه الدراسة على الحاجة إلى وضع سياسات تعليمية وقائية متنوعة و متلائمة مع حاجيات الطلاب وكذلك ضرورة التقصي المبكر لهدف الشروع بعلاج مبكر قادر على تحسين تطورات الإصابة بهذه الاضطرابات.

الكلمات المفتاحيح :اضطرابات الأكل ،طلاب الصحّة ، طلاب الطّبّ ،طلاّب الصيدلة ،طلاّب طبّ الأسنان ، معدّل الانتشار، عوامل الإختطار ، الانحدار اللوجستي ، استبيان ، تونس

BACKGROUND

Eating disorders (ED) are persistent and severe disturbances of feeding habit (1) including anorexia nervosa and bulimia nervosa, which are the most common characteristics of the ED (2). The etiology of these disorders is multifactorial, in fact, researchers generally work within a "bio-psychosocial" model when trying to understand the factors contributing to disordered eating behaviors(3). These disorders are pervasive in male and female youngsters worldwide (4-10) and a recognized public health concern given their high prevalence, morbidity and co-morbidity with other somatic and mental health conditions (11-13). In fact, they frequently occur with psychiatric disorders such as depression, anxiety disorders (14, 15) and substance abuse (16). Disordered eating behaviors can occur also with many harmful physical health consequences such as cardiovascular and pulmonary problems severe electrolyte abnormalities, bone demineralization, gastrointestinal problems and endocrine abnormalities (17, 18). ED and body dissatisfaction were also shown associated with marked impairment in many aspects of the quality of life related to mental health, psychosocial functioning and some aspects of physical health (19, 20). Mortality noted among these disorders is high especially in the case of anorexia nervosa. Such disorders have the highest mortality of all mental disorders with a standardized mortality ratio of six (21). The costs of ED resulting from health care utilization and productivity loss are substantial, so the mean costs of ED was, according to a recent German study, about 6,000 Euros (22).

University students and particularly the health occupation ones who are exposed to high levels of stress and the proportion of them suffering from psychological problems has increased markedly (23, 24). The latters were shown at particular risk for ED compared with students in other study programs (25). Although their high prevalence among young population and their severity, ED researches in Tunisian undergraduate students were rare. Indeed, Medline database query until December 2015 found only a single published article dealing with disordered eating behaviors in non-clinical university students (26). Given to the severity and difficulty of treating these problems, prevention of them is a public health goal (27). Hence, in many countries the field of ED prevention has grown rapidly in the past two decades. In these countries many prevention programs implemented on university campuses were analyzed in order to make recommendations for future preventive initiatives based on interventions and approaches that were demonstrated to be the most effective (28, 29). Recently there have been numerous

successful ED prevention programs reporting a positive impact on ED pathology(28) and other controlled trials are currently ongoing which would provide new evidence to improve and enhance disordered eating prevention programs (30).

The objective of this study was to determine the prevalence of disordered eating behaviors among health occupation students at the University of Monastir and to identify its associated factors.

METHODS

Study setting

This study was conducted in the University of Monastir which comprises 10 establishments of higher education with 26,058 students registered in 2012 (31). The ESE2S study (Etat de Santé des Etudiants en Sciences de Santé: Health of Students in Health Sciences) is a study conducted by GRASSE2S (Groupe de Recherche Action sur la Santé des Etudiants en Sciences de Santé: A Research Action Group focused on the Health of health occupation Students) involving lecturers and student researchers in Medicine, Dentistry and Pharmacy in Tunisia. The mission of this group is to promote the health of students in the health sectors and particularly with regard to the adoption of a healthy lifestyle. This study was conducted in three Health Science Faculties: Medicine, Pharmacy and Dentistry. These three faculties share the characteristic of the predominance of female students (31). The curriculum in these faculties is known to be long, difficult and stressful.

Study design and population

This cross sectional study was conducted among students from second, fourth and sixth year. The choice of only one level of study in each cycle was based, in addition to the operational considerations, on the change of learning style from one cycle to another, so we focused on second year to represent the first cycle because the first year is a period of adjustment to the university life. Concerning the second cycle, we chose the fourth year because it was an intermediate year. For the third cycle, we opted for the sixth year students because it is the only level of postgraduate study in dentistry and pharmacy and due to the unavailability of the seventh year medical students as they are busy preparing for the Residency National Exam.

Questionnaire and data Collection

It was a self-administered anonymous questionnaire written in French and adapted from ELSE study (Etude Longitudinal sur la Santé des Etudiants: longitudinal study of students' health) (32). The research group including epidemiologist, psychiatrist and a doctor in charge of the University Health determined content validity of the scale. The questionnaire was pilot-tested on a sample of volunteer students. Uncertainties and misleading questions were revised according to this test. The study was carried out between April 2013 and September 2014. After the approval of the deans of the faculties, students were informed about the ESE2S study using posters and invitations on social networks to motivate them to participate in this survey. Then students were directly approached at the faculties and on hospital internship sites. Investigators of the study group explained the aim and the benefit of the study and informed the students that their participation was voluntary, and assured that the information collected will be anonymous and confidential. These information and details concerning the answers were also explained to respondents in a written form attached to the questionnaire.

Measures

The questionnaire consisted of many parts: demographic, educational and socioeconomic characteristics; substance abuse (tobacco, alcohol), sport practice, stress, internet use and sleep status. *ED* were assessed using *SCOFF questionnaire*. Its acronym is derived from initial wordings in its five items**:** Sick, Control, One stone, Fat, Food. It is a screening tool for detecting Eating Disorders: anorexia nervosa and bulimia nervosa in young adults (33). This questionnaire consisted of five dichotomous questions; one point was given for every "Yes" answer and a total score equal or greater than two indicates a likely case of ED. The French version of SCOFF questionnaire (SCOFF-F) was validated and demonstrated as being an accurate and a reliable tool of ED in a French speaking student population (34, 35).

Perceived Stress Scale (PSS), 10-item French version, was used to assess the level of stress among students (36,37) . To measure depression we used the *BDI (Beck Depression Inventory)* 13 short form items. A score equal to or higher than eight indicated depression (38,39). A student was defined as *regular smoker* if he

reported smoking, the day of collecting data, at least one cigarette per day. Use of alcohol was assessed using *ADOSPA (Adolescents et Substances Psycho-actives) questionnaire* which is a performing tool to identifying harmful alcohol and cannabis consumption among adolescent and young adult population. A total score equal or higher than two indicated a regular use of alcohol (40). *Cyber addiction* was assessed using *Orman scale,* it's a nine-item test that classifies a student with more than four positive questions as having a risk of net addiction (41). A student was considered having an *academic difficulty* if he had the experience of revalidating an internship, repeat an academic year or sit for the control exam session.

Statistical analysis

The statistical analysis was conducted using SPSS (Statistical Package for the Social Sciences) version 18. A descriptive statistic was performed for all variables: categorical variables were presented as percentages. Minimum-Maximum (Min-Max), mean, Standard Deviation (SD), median, first and third quartiles were computed for quantitative variables. Prevalence was accompanied by its 95% Confidence Interval (95% CI). Associations were tested with Chi 2 test for comparing percentages and with either Mann Whitney test or Kruskall Wallis test for comparing means. The association between ED and demographic, socioeconomic, educational and health characteristics was studied using both univariate and multivariate models. In univariate analysis, we calculated crude Odds Ratio (c OR) and its associated 95% CI, then we used a multivariate logistic regression models to adjust for confounding variables (variables with a signification less than 0.2 in univariate analysis were introduced in the multivariate model) by calculating the adjusted Odds Ratio (a OR). All tests were assessed at 5% significance level.

RESULTS

A total of 974 students were included in the study with a sample size of 286 in Medicine, 217 in Dentistry and 349 in Pharmacy. The mean (SD) age of students was 22.8(SD=2.2) with a sex ratio of 0.43. The demographic, socioeconomic, educational and health characteristics of the study population were described in table 1. Student answers to the five items of the SCOFF scale were represented in table 2. The most common disorder among the five items of the SCOFF scale affected the second item "worry of having lost Control over how much you eat", exploring eating behavior and that concerned 39% of the population. Concerning body image perception explored by the fourth item "believe yourself to be Fat when others say you are too thin" it was noted in 28% of cases: Female health occupation students were significantly more exposed to these two disorders (p<10^{-3}). SCOFF scores distributed by establishment, sex and year of study were represented in figure 1. Mean SCOFF score was 1.23±1.23 (median=1(0-2), Min-Max=0-5). SCOFF Scores differed significantly according to sex (male: mean= 0.91±1.10, median=1(0-1), Min-Max=0-5 Vs female: mean=1.35±1.25, median=1(0-1), Min-Max=0-5), and establishment (Medicine: 1.06±1.08; Dentistry: 1.16±1.25 and Pharmacy: 1.43±1.29): appendix 1. The prevalence of ED according to SCOFF questionnaire among health occupation students in the university of Monastir was 35%, 95% CI [32.0-38.5]. It was higher among females (39.8, 95% CI [35.8-43.7]) compared to males (24.3, 95% CI [18.8-29.7]) with a statistically significant difference (p<10^{-3}). Eating disordered behavior was the highest among pharmacy students (39.7%, 95% CI [34.4-45.4]); in this faculty, the prevalence ranged from 32% among male students to 41% among female students and a gradient of prevalence was noted between years of study, so the prevalence of ED has decreased from 46% in second year to 34% in sixth year. A female pharmacy student in second year was hence considered to be the most exposed to developing ED (figure 2, appendix 2). The results of the univariate analysis were shown in table 3 A. The factors found significantly related to ED were: female sex, stress, depression, self-esteem, sleep quality, cyber addiction and having a previous dieting. A multivariate logistic regression analysis (table 3 B) showed three independently significantly associated factors with ED: Female sex (p=0.02, a OR=1.77, 95% CI [1.13-2.77]); repeat a year (p=0.02, a OR=1.76, 95% CI [1.09-2.85]) and having a previous dieting (p=**10^{-3}**, a OR=4.13, 95% CI [2.79-6.12]).

Table 1. Characteristics n (%) of health occupation students (ESE2S Study, Monastir, 2013)

A.Demographic and educational characteristics

	Medicine			Dentistry			Pharmacy			Total		
	Male (n=89)	Female (n=197)	Total (N=286)	Male (n=122)	Female (n=217)	Total (N=339)	Male (n=82)	Female (n=267)	Total (N=349)	Male (n=293)	Female (n=681)	Total (N=974)
Marital status												
Single	64(71.9)	128(65.0)	**192(67.1)**	67(54.9)	111(51.2)	**178(52.5)**	56(68.3)	197(73.8)	**253(72.5)**	187(63.8)	436(64.0)	**623(64.0)**
In couple	19(21.3)	41(20.8)	**60(21.0)**	44(36.1)	78(35.9)	**122(36.0)**	15(18.3)	42(15.7)	**57(16.4)**	78(26.6)	161(23.6)	**239(24.5)**
Married	2(02.3)	14(07.1)	**16(05.6)**	7(05.7)	20(09.2)	**27(08.0)**	2(02.4)	10(03.8)	**12(03.4)**	11(03.8)	44(06.5)	**55(05.6)**
NP	4(04.5)	14(07.1)	**18(06.3)**	4(03.3)	8(03.7)	**12(03.5)**	9(11.0)	18(06.7)	**27(07.7)**	17(05.8)	40(05.9)	**57(05.9)**
Year of study												
Second	23(25.8)	87(44.2)	**110(38.5)**	25(20.5)	57(26.3)	**82(24.2)**	34(41.5)	132(49.5)	**166(47.6)**	82(28.0)	276(40.5)	**358(36.8)**
Fourth	35(39.4)	54(27.4)	**89(31.1)**	30(24.6)	41(18.9)	**71(20.9)**	26(31.7)	77(28.8)	**103(29.5)**	91(31.0)	172(25.3)	**263(27.0)**
Sixth	31(34.8)	56(28.4)	**87(30.4)**	67(54.9)	119(54.8)	**186(54.9)**	22(26.8)	58(21.7)	**80(22.9)**	120(41.0)	233(34.2)	**353(36.2)**
Choice of study sector												
Personnel choice	61(68.6)	153(77.7)	**214(74.8)**	83(68.0)	160(73.7)	**243(71.7)**	64(78.0)	213(79.8)	**277(79.4)**	208(71.0)	526(77.3)	**734(75.4)**
Family's suggestion	24(27.0)	40(20.3)	**64(22.4)**	25(20.5)	36(16.7)	**61(18.0)**	14(17.1)	44(16.5)	**58(16.6)**	63(21.5)	120(17.6)	**183(18.8)**
Friend's suggestion	2(02.2)	2(01.0)	**4(01.4)**	12(09.8)	17(07.8)	**29(08.5)**	3(03.7)	7(02.6)	**10(02.9)**	17(05.8)	26(03.8)	**43(04.4)**
NP	2(02.2)	2(01.0)	**4(01.4)**	2(01.7)	4(01.8)	**6(01.8)**	1(01.2)	3(01.1)	**4(01.1)**	5(01.7)	9(01.3)	**14(01.4)**
Reason of choice												
Humanism	30(33.7)	113(57.4)	**143(50.0)**	22(18.0)	80(36.9)	**102(30.1)**	16(19.5)	88(33.0)	**104(29.8)**	68(23.2)	281(41.3)	**349(35.8)**
Social status	26(29.2)	43(21.8)	**69(24.1)**	49(40.2)	79(36.4)	**128(37.8)**	23(28.0)	102(38.2)	**125(35.8)**	98(33.4)	224(32.9)	**322(33.1)**
Wealth	17(19.1)	9(04.6)	**26(09.1)**	37(30.3)	23(10.6)	**60(17.7)**	24(29.3)	21(07.9)	**45(12.9)**	78(26.6)	53(07.8)	**131(13.4)**
Others	14(15.7)	27(13.7)	**41(14.4)**	9(07.4)	27(12.4)	**36(10.6)**	18(22.0)	46(17.2)	**64(18.3)**	41(14.0)	100(14.7)	**141(14.5)**
NP	2(02.3)	5(02.5)	**7(02.4)**	5(04.1)	8(03.7)	**13(03.8)**	1(01.2)	10(03.7)	**11(03.2)**	8(02.8)	23(03.4)	**31(03.2)**
Academic difficulties												
Retake session	45(50.6)	88(44.7)	**133(46.5)**	103(84.4)	154(71.0)	**257(75.8)**	53(64.6)	168(62.9)	**221(63.3)**	201(68.6)	410(60.2)	**611(62.7)**
Repeat a year	14(15.7)	35(17.8)	**49(17.1)**	37(30.3)	44(20.3)	**81(23.9)**	19(23.2)	40(15.0)	**81(23.2)**	70(23.9)	119(17.5)	**189(19.4)**
Revalidate internship	14(15.7)	12(06.1)	**26(09.1)**	12(09.8)	18(08.3)	**30(08.8)**	8(09.8)	1(00.4)	**9(02.6)**	34(11.6)	31(04.6)	**65(06.7)**

NP: Not Precised

B. Socioeconomic characteristics:

	Medicine			Dentistry			Pharmacy			Total		
	Male (n=89)	Female (n=197)	Total (N=286)	Male (n=122)	Female (n=217)	Total (N=339)	Male (n=82)	Female (n=267)	Total (N=349)	Male (n=293)	Female (n=681)	Total (N=974)
Living arrangement												
Rental home	44(49.4)	75(38.1)	**119(41.6)**	101(82.8)	154(71.0)	**255(75.2)**	67(81.7)	168(62.9)	**235(67.3)**	212(72.4)	397(58.3)	**609(62.5)**
With parents	4(04.5)	83(42.1)	**123(43.0)**	15(12.3)	41(18.8)	**56(16.5)**	11(13.4)	52(19.5)	**63(18.1)**	66(22.5)	176(25.8)	**242(24.9)**
Residence hall	2(02.3)	27(13.7)	**29(10.2)**	1(00.8)	11(05.1)	**12(03.6)**	-	40(15.0)	**40(11.5)**	3(01.0)	78(11.5)	**81(08.3)**
NP	3(03.4)	12(06.1)	**15(05.2)**	5(04.1)	11(05.1)	**16(04.7)**	4(04.9)	7(02.6)	**11(03.1)**	12(04.1)	30(04.4)	**42(04.3)**
Financial difficulties	17(19.1)	49(24.9)	**66(23.1)**	36(29.5)	52(24.0)	**88(26.0)**	26(31.7)	32(12.0)	**58(16.6)**	79(27.0)	133(19.5)	**212(21.8)**
Community life												
Club	26(29.2)	23(11.7)	**16(05.6)**	32(26.2)	45(20.7)	**49(14.5)**	16(19.5)	49(18.4)	**60(17.2)**	42(14.3)	83(12.2)	**191(19.6)**
RSSF*	6(06.7)	10(05.1)	**16(05.6)**	17(13.9)	32(14.7)	**49(14.5)**	19(23.2)	41(15.4)	**60(17.2)**	17(05.8)	108(15.9)	**125(12.8)**
NGO¥	13(14.6)	18(09.1)	**31(10.8)**	14(11.5)	16(07.4)	**30(08.8)**	12(14.6)	32(12.0)	**44(12.6)**	39(13.3)	66(09.7)	**105(10.8)**
Political party	4(04.5)	3(01.5)	**7(02.4)**	8(06.6)	9(04.1)	**17(05.0)**	10(12.2)	8(03.0)	**18(05.2)**	22(07.5)	20(02.9)	**42(04.3)**
Parent having health profession	29(32.6)	35(17.8)	**64(22.4)**	31(25.4)	54(24.9)	**85(25.1)**	31(37.8)	74(27.7)	**105(30.1)**	91(31.1)	163(23.9)	**254(26.1)**
Parent's social status												
Living together	78(87.7)	169(85.8)	**247(86.4)**	103(84.4)	185(85.3)	**288(85.0)**	75(91.5)	238(89.1)	**313(89.7)**	256(87.4)	592(86.9)	**848(87.1)**
Parent(s) died	5(05.7)	16(08.1)	**21(07.3)**	10(08.2)	16(07.4)	**26(07.6)**	4(04.9)	13(04.9)	**17(04.9)**	19(06.5)	45(06.6)	**64(06.6)**
Divorced	2(02.2)	7(03.6)	**9(03.2)**	8(06.6)	11(05.1)	**19(05.6)**	2(02.4)	8(03.0)	**10(02.9)**	12(04.1)	26(03.8)	**38(03.9)**
Parent(s) immigrated	2(02.2)	1(00.5)	**3(01.0)**	-	-	**-**	-	3(01.1)	**3(00.8)**	2(00.6)	4(00.6)	**6(00.6)**
NP	2(02.2)	4(02.0)	**6(02.1)**	1(00.8)	5(02.2)	**6(01.8)**	1(01.2)	5(01.9)	**6(01.7)**	4(01.4)	14(02.1)	**18(01.8)**

*RSSF: Representative structure of students in the faculty ¥NGO: Non-Governmental Organization   NP: Not Precised

C. Health characteristics:

	Medicine			Dentistry			Pharmacy			Total		
	Male (n=89)	Female (n=197)	Total (N=286)	Male (n=122)	Female (n=217)	Total (N=339)	Male (n=82)	Female (n=267)	Total (N=349)	Male (n=293)	Female (n=681)	Total (N=974)
Sport practice												
No	39(43.8)	163(82.7)	**202(70.7)**	65(53.3)	151(69.6)	**216(63.7)**	31(37.8)	208(77.9)	**239(68.5)**	135(46.1)	522(76.7)	**657(67.5)**
Yes	43(48.3)	32(16.3)	**75(26.2)**	55(45.1)	64(29.5)	**119(35.1)**	47(57.3)	57(21.3)	**104(29.8)**	145(49.5)	153(22.5)	**298(30.5)**
NP	7(07.9)	2(01.0)	**9(03.1)**	2(01.6)	2(00.9)	**4(01.2)**	4(04.9)	2(00.8)	**6(01.7)**	13(04.4)	6(00.8)	**19(02.0)**
Alcohol regular use												
No	1(01.1)	1(00.5)	**2(00.7)**	7(05.7)	9(04.2)	**16(04.7)**	7(08.5)	3(01.1)	**10(02.9)**	15(05.1)	13(01.9)	**28(02.9)**
Yes	4(04.5)	2(01.0)	**6(02.1)**	45(36.9)	22(10.1)	**67(19.8)**	24(29.3)	8(03.0)	**32(09.1)**	73(24.9)	32(04.7)	**105(10.8)**
NP	18(20.2)	6(03.0)	**24(08.4)**	16(13.1)	17(07.8)	**33(09.7)**	15(18.3)	24(09.0)	**268(76.8)**	49(16.7)	46(06.8)	**95(09.7)**
NC	66(74.2)	188(95.5)	**254(88.8)**	54(44.3)	169(77.9)	**223(65.8)**	36(43.9)	232(86.9)	**39(11.2)**	156(53.3)	590(86.6)	**746(76.6)**
Smokers												
Yes	24(27.0)	5(02.5)	**29(10.1)**	45(36.9)	30(13.8)	**75(22.1)**	36(43.9)	30(11.2)	**66(18.9)**	105(35.8)	65(09.5)	**170(17.5)**
No	65(73.0)	192(97.5)	**257(89.9)**	74(60.7)	186(85.7)	**260(76.7)**	45(54.9)	234(87.7)	**279(79.9)**	184(62.8)	612(89.9)	**796(81.7)**
NP	-	-	**-**	3(02.4)	1(00.5)	**4(01.2)**	1(01.2)	3(01.1)	**4(01.2)**	4(01.4)	4(00.6)	**8(00.8)**
Stress												
Eustress	64(71.9)	124(62.9)	**188(65.7)**	90(73.8)	144(66.4)	**234(69.0)**	53(64.6)	165(61.8)	**218(62.5)**	207(70.6)	433(63.6)	**640(65.7)**
Distress	13(14.6)	60(30.5)	**73(25.6)**	22(18.0)	61(28.1)	**83(24.5)**	18(22.0)	85(31.8)	**103(29.5)**	53(18.1)	206(30.2)	**259(26.6)**
NP	12(13.5)	13(06.6)	**25(08.7)**	10(08.2)	12(05.5)	**22(06.5)**	11(13.4)	17(06.4)	**28(08.0)**	33(11.3)	42(06.2)	**75(07.7)**
Depression												
Yes	44(49.4)	129(65.5)	**173(60.5)**	54(44.3)	123(56.7)	**142(41.9)**	39(47.6)	166(62.2)	**205(58.7)**	137(46.8)	418(61.4)	**555(57.0)**
No	32(36.0)	55(27.9)	**87(30.4)**	59(48.3)	83(38.2)	**177(52.2)**	23(28.0)	75(28.1)	**98(28.1)**	114(38.9)	213(31.3)	**327(33.6)**
NP	13(14.6)	13(06.6)	**26(09.1)**	9(07.4)	11(05.1)	**20(05.9)**	20(24.4)	26(09.7)	**46(13.2)**	42(14.3)	50(07.3)	**92(09.4)**
Cyber addiction												
Yes	8(09.0)	18(09.1)	**26(09.1)**	19(15.6)	32(14.7)	**51(15.0)**	2(02.4)	39(14.6)	**41(11.7)**	29(09.9)	89(13.0)	**118(12.1)**
No	65(73.0)	165(83.8)	**230(80.4)**	95(77.8)	167(77.0)	**262(77.3)**	65(79.3)	201(75.3)	**266(76.3)**	225(76.8)	533(78.3)	**758(77.8)**
NP	16(18.0)	14(07.1)	**30(10.5)**	8(06.6)	18(08.3)	**26(07.7)**	15(18.3)	27(10.1)	**42(12.0)**	39(13.3)	59(08.7)	**98(10.1)**
Sleep quality												
Good	52(58.4)	122(61.9)	**174(60.8)**	93(76.3)	161(74.2)	**254(74.9)**	39(47.6)	179(67.0)	**218(62.5)**	184(62.8)	462(67.8)	**646(66.3)**
Bad	22(24.7)	59(30.0)	**81(28.3)**	22(18.0)	42(19.3)	**64(18.9)**	28(34.1)	76(28.5)	**104(29.8)**	72(24.6)	177(26.0)	**249(25.6)**
NP	15(16.9)	16(08.1)	**31(10.9)**	7(05.7)	14(06.5)	**21(06.2)**	15(18.3)	12(04.5)	**27(07.7)**	37(12.6)	42(06.2)	**79(08.1)**
Previous dieting												
Yes	12(13.5)	54(27.4)	**66(23.1)**	13(10.7)	57(26.3)	**70(20.6)**	16(19.5)	85(31.8)	**101(28.9)**	41(14.0)	196(28.8)	**237(24.3)**
No	76(85.4)	143(72.6)	**219(76.6)**	84(68.8)	126(58.0)	**210(61.9)**	66(80.5)	182(68.2)	**248(71.1)**	226(77.1)	451(66.2)	**677(69.5)**
NP	1(01.1)	-	**1(76.6)**	25(20.5)	34(15.7)	**59(17.4)**	-	-	**-**	26(08.9)	34(05.0)	**60(06.2)**
Self esteem												
Yes	62(69.6)	150(76.1)	**212(74.2)**	93(76.2)	171(78.8)	**264(77.9)**	53(64.6)	189(70.8)	**242(69.3)**	208(71.0)	510(74.9)	**718(73.7)**
No	15(16.9)	38(19.3)	**53(18.5)**	22(18.0)	38(17.5)	**60(17.7)**	12(14.6)	62(23.2)	**74(21.2)**	49(16.7)	138(20.3)	**187(19.2)**
NP	12(13.5)	9(04.6)	**21(07.3)**	7(05.8)	8(03.7)	**15(04.4)**	17(20.8)	16(6.0)	**33(09.5)**	36(12.3)	33(04.8)	**69(07.1)**

NP: Not Precised,NC: Not Concerned

Table 2. Frequency components of the SCOFF scale n(%) among health occupation students (ESE2S Study, Monastir, 2013).

		Medicine			Dentistry			Pharmacy			Total			
		Male n=75	Female n=173	Total N=248	Male n=99	Female n=190	Total N=289	Male n=65	Female n=237	Total N=302	Male n=239	Female n=600	p	Total N=839
1.	S	4(05.3)	19(11.0)	23(09.3)	14(14.1)	24(12.6)	**38(13.1)**	9(13.8)	38(16.0)	**47(15.6)**	27(11.3)	81(13.5)	0.47	**108(12.9)**
2.	C	18(24.0)	76(43.9)	94(37.9)	29(29.3)	74(38.9)	**103(35.6)**	21(32.3)	108(45.6)	**129(42.7)**	68(28.5)	258(43.0)	10^{-3}	**326(38.9)**
3.	O	10(13.3)	30(17.3)	40(16.1)	17(17.2)	35(18.4)	**52(18.0)**	17(26.2)	48(20.3)	**65(21.5)**	44(18.4)	113(18.8)	0.77	**157(18.7)**
4.	F	7(09.3)	52(30.1)	59(23.8)	17(17.2)	61(32.1)	**78(27.0)**	10(15.4)	90(38.0)	**100(33.1)**	34(14.2)	203(33.8)	10^{-3}	**237(28.2)**
5.	F	8(10.7)	39(22.5)	47(19.0)	20(20.2)	44(23.2)	**64(22.1)**	17(26.2)	73(30.8)	**90(29.8)**	45(18.8)	156(26.0)	0.02	**201(24.0)**

S: Make yourself Sick others say you are too thin   C: Worry you have lost Control over how much you eat   F: Believe yourself to be Fat when

O: Lost more than One stone in a 3 month period   F: Food dominates your life

Table 3. Factors associated with eating disorder among health occupation students. (ESE2S Study, Monastir, 2013).

A- **Univariate analysis**

		N n	Eating disorder %	p	Crude OR	95% CI
Demographic factors						
Sex	Male	239	58 24.3	**<10⁻³**	1	
	Female	600	239 39.8		2.10	**[1.47-2.90]**
Marital status	Married	51	17 33.3	0.785	1	
	Single	744	262 35.2		1.10	[0.60-1.98]
Establishment	Medicine	248	81 32.7	0.283	1	
	Pharmacy/Dentistry	591	216 36.5		1.19	[0.87.1.62]
Educational factors						
Cycle of study	Intern	312	110 35.3	0.960	1	
	Extern	525	186 35.4		1.01	[0.75-1.35]
Choice of career	Others	191	66 34.6	0.775	1	
	Personal	639	228 35.7		1.05	[0.75.1.47]
Reason of choice	Other reasons	511	183 35.8	0.909	1	
	Humanity	301	109 36.2		1.02	[0.76.1.37]
Control session	Yes	524	186 35.5	0.993	1	
	No	304	108 35.5		1.00	[0.74-1.34]
Revalidation of internship	Yes	49	15 30.6	0.485	1	
	No	743	264 35.5		1.25	[0.67-2.34]
Repeating a year	Yes	167	49 29.3	0.080	1	
	No	631	231 36.6		1.391	[0.96-2.01]
Academic difficulties	Yes	544	192 35.3	0.903	1	
	No	294	105 35.7		1.02	[0.76. 1.37]

B- Univariate analysis(continued)

		N	Eating disorder		p	Crude OR	95% CI
			n	%			
Socioeconomic factors							
Living arrangement	Alone	592	208	35.1	0.89	1	
	With family	219	78	35.6		1.02	[0.74-1.41]
Financial difficulties	No	649	223	34.4	0.25	1	
	Yes	185	72	38.9		1.22	[0.87. 1.70]
Community life	No	251	88	35.1	0.88	1	
	Yes	584	208	35.6		1.02	[0.75-1.40]
Social status of parents	Separated	95	33	34.7	0.89	1	
	Together	733	260	35.5		1.03	[0.66. 1.62]
Parent having health profession	No	612	214	35.0	0.86	1	
	Yes	219	78	35.6		1.03	[0.74. 1.42]
Health factors							
Sport practice	Yes	263	82	31.2	0.08	1	
	No	573	214	37.3		1.32	[0.96-1.80]
Alcohol regular use	No	24	6	25.0	0.91	1	[0.38-3.00]
	Yes	88	23	26.1		1.06	
Smokers	Yes	136	47	34.6	0.85	1	
	No	698	247	35.4		1.04	[0.70-1.53]
Stress	Eustress	568	184	32.4	**0.01**	1	
	Distress	221	93	42.1		**1.52**	**[1.10-2.09]**
Self esteem	Yes	622	201	32.3	**<10⁻³**	1	
	No	170	80	47.1		**1.86**	**[1.32-2.63]**
Depression	No	281	75	26.7	**<10⁻³**	1	
	Yes	492	196	39.8		1.82	**[1.32-2.50]**
Sleep quality	Good	564	186	33.0	**0.01**	1	
	Bad	221	95	43.0		**1.53**	**[1.11-2.11]**
Cyber addiction	No	665	213	32.0	**<10⁻³**	1	
	Yes	105	53	50.5		**2.16**	**[1.43-3.28]**
Previous diet	No	564	145	25.7	**<10⁻³**	1	
	Yes	228	136	59.6		**4.27**	**[3.09-5.91]**

C- Multivariate analysis

	Risk factor	Reference	Univariate analysis			Multivariate analysis		
			p	Crude OR	95% CI	p	Adjusted OR	95% CI
Sex	**Female**	Male	**<10⁻³**	2.10	[1.47-2.90]	**0.02**	**1.77**	**[1.13-2.77]**
Repeating a year	**No**	Yes	0.080	1.39	[0.96-2.01]	**0.02**	**1.76**	**[1.09-2.85]**
Sport practice	No	Yes	0.083	1.32	[0.96-1.80]	0.28	1.26	[0.83-1.90]
Stress	Distress	Eustress	**0.010**	1.52	[1.10-2.09]	0.47	1.17	[0.76-1.78]
Depression	No	Yes	**<10⁻³**	1.82	[1.32-2.50]	0.29	1.26	[0.82-1.94]
Sleep quality	Bad	Good	**0.009**	1.53	[1.11-2.11]	0.09	1.43	[0.95-2.15]
Cyber addiction	Yes	No	**<10⁻³**	2.16	[1.43-3.28]	0.10	1.54	[0.91-2.58]
Previous diet	**Yes**	No	**<10⁻³**	4.27	**[3.09-5.91]**	**<10⁻³**	**4.13**	**[2.79-6.12]**
Self esteem	No	Yes	**<10⁻³**	1.86	[1.32-2.63]	0.25	1.31	[0.82-2.08]

95% CI: 95 % Confidence Interval,OR: Odds Ratio
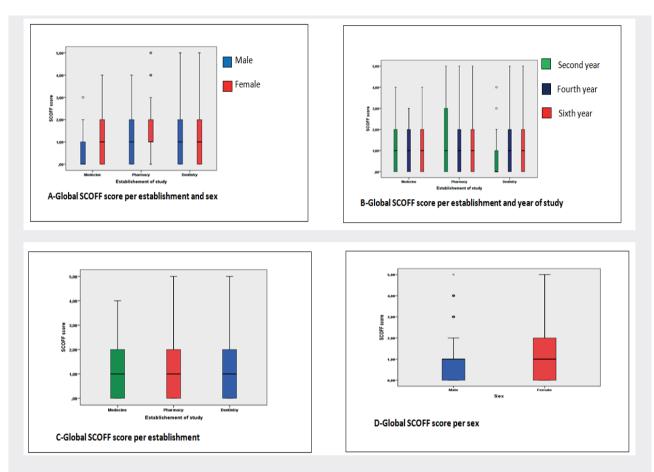
Figure 1. Global SCOFF score among health occupation students (ESE2S Study, Monastir, 2013)
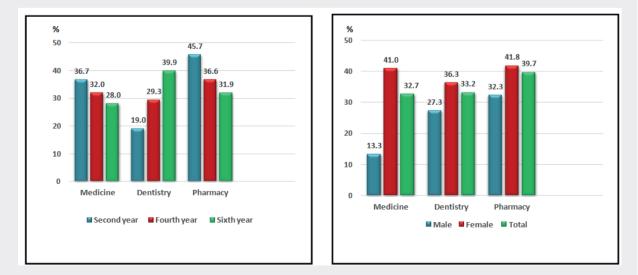

Figure 2: Eating disorders' prevalence among health occupation students (ESE2S Study, Monastir, 2013)

Appendix 1. Global SCOFF score among health occupation students (ESE2S Study, Monastir, 2013)

	Medicine			Dentistry			Pharmacy			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Second year												
Mean±SD	0.70±0.66	1.32±1.18	**1.19±1.12**	0.53±1.12	0.69±0.85	**0.65±0.92**	1.39±1.42	1.65±1.33	**1.60±1.34**	0.97±1.20	1.35±1.25	**1.27±1.24**
Min-Max	0-2	0-4	**0-4**	0-4	0-3	**0-4**	0-4	0-5	**0-5**	0-4	0-5	**0-5**
Median(Q1-Q3)	1(0-1)	1(0-2)	**1(0-2)**	0(0-1)	0(0-1)	**0(0-1)**	1(0-2.75)	1(1-3)	**1(0-3)**	1(0-2)	1(0-2)	**1(0-2)**
Fourth year												
Mean±SD	0.61±0.87	1.30±1.10	**1.04±1.07**	0.92±1.41	1.42±1.30	**1.20±1.36**	0.95±0.97	1.39±1.22	**1.29±1.17**	0.81±1.11	1.37±1.19	**1.18±1.19**
Min-Max	0-3	0-3	**0-3**	0-5	0-4	**0-5**	0-3	0-5	**0-5**	0-5	0-5	**0-5**
Median(Q1-Q3)	0(0-1)	1(0-2)	**1(0-2)**	0(0-1)	1(0-2.5)	**1(0-2)**	1(0-1.5)	1(0.25-2)	**1(0-2)**	1(0-1)	1(0-2)	**1(0-2)**
Sixth year												
Mean±SD	0.59±0.70	1.08±1.14	**0.90±1.03**	1.12±1.11	1.45±1.35	**1.33±1.28**	0.94±1.18	1.36±1.32	**1.26±1.29**	0.95±1.00	1.34±1.30	**1.21±1.23**
Min-Max	0-2	0-4	**0-4**	0-4	0-5	**0-5**	0-3	0-5	**0-5**	0-4	0-5	**0-5**
Median(Q1-Q3)	0(0-1)	1(0-2)	**1(0-2)**	1(0-2)	1(0-2)	**1(0-2)**	0.5(0-1.75)	1(0-2)	**1(0-2)**	1(0-2)	1(0-2)	**1(0-2)**
Total												
Mean±SD	0.63±0.75	1.25±1.15	**1.06±1.08**	0.98±1.20	1.25±1.27	**1.16±1.25**	1.14±1.23	1.51±1.30	**1.43±1.29**	0.91±1.10	1.35±1.25	**1.23±1.23**
Min-Max	0-3	0-4	**0-4**	0-5	0-5	**0-5**	0-4	0-5	**0-5**	0-5	0-5	**0-5**
Median(Q1-Q3)	0(0-1)	1(0-2)	**1(0-2)**	1(0-2)	1(0-2)	**1(0-2)**	1(0-2)	1(0.5-2)	**1(0-2)**	1(0-1)	1(0-2)	**1(0-2)**

SD: Standard Deviation ,Q1-Q3: First quartile-Third quartile

Appendix 2 . Eating disorder prevalence among health occupation students according to SCOFF scale (ESE2S Study, Monastir. 2013)

	Medicine			Dentistry			Pharmacy			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Second year	n=20	n=78	N=98	n=15	n=48	N=63	n=28	n=112	N=140	n=63	n=238	N=301
n(%)	2(10.0)	34(43.6)	36(36.7)	2(13.3)	10(20.8)	12(19.0)	12(42.9)	52(46.4)	64(45.7)	16(25.4)	96(40.3)	112(37.2)
CI95%	00.0-25.0	32.1-55.1	26.6-45.9	0.00-33.3	10.4-33.3	05.2-09.5	25.0-60.7	36.6-56.2	37.9-55.0	14.3-36.5	34.0-47.1	31.6-42.5
Fourth year	n=28	n=47	N=75	n=25	n=33	N=58	n=21	n=72	N=93	n=74	n=152	N=226
n(%)	5(17.9)	19(40.4)	24(32.0)	5(20.0)	12(36.4)	17(29.3)	5(23.8)	29(40.3)	34(36.6)	15(20.3)	60(39.5)	75(33.2)
CI95%	03.6-35.6	25.5-55.3	21.3-44.0	4.0-36.0	21.2-54.5	17.2-41.4	04.8-42.9	29.2-51.4	26.9-46.2	10.8-29.7	31.6-47.4	27.0-39.4
Sixth year	n=27	n=48	N=75	n=59	n=109	N=168	n=16	n=53	N=69	n=102	n=210	N=312
n (%)	3(11.1)	18(37.5)	21(28.0)	20(33.9)	47(43.1)	67(39.9)	4(25.0)	18(34.0)	22(31.9)	27(26.5)	83(39.5)	110(35.3)
CI95%	00.0-25.8	25.0-52.1	18.7-38.7	22.0-45.7	33.9-52.3	32.7-47.6	06.3-50.0	20.8-47.2	21.7-43.5	17.6-35.3	33.3-46.2	30.1-40.7
Total	n=75	n=173	N=248	n=99	n=190	N=289	n=65	n=237	N=302	n=239	n=600	N=839
n(%)	10(13.3)	71(41.0)	81(32.7)	27(27.3)	69(36.3)	96(33.2)	21(32.3)	99(41.8)	120(39.7)	58(24.3)	239(39.8)	297(35.4)
CI95%	06.7-21.3	33.5-48.6	27.0-38.3	19.2-36.4	29.5-43.7	28.0-38.8	21.5-44.6	35.4-48.5	34.4-45.4	18.8-29.7	35.8-43.7	31.9-38.5

DISCUSSION

ED among university students is an important public health problem since young people are the most exposed to these disorders strongly related to many somatic and psychiatric co morbidities (11). The need of more active preventive measures among university students was established (28, 42-45). In this context, this study focused on these disorders among health occupational students as a first step to initiate an adequate intervention strategy.

ED Prevalence

In this sample of health occupational students, the prevalence of positive SCOFF screens was 35%, about 40% among females and 24% among males. These eating pathological conditions represent as a public health concern given, not only, the high prevalence but also because of the harmful consequences for physical health and emotional well-being with substantial personal and societal costs (11, 22). The studies on the epidemiology of eating disorders in Tunisia were limited to one study among 107 students at the Institute of Press and Information Sciences of Manouba (26), Tunis. This study has yielded eating disorder prevalence, using another screening test: the Eating Attitude Test long version 40 items, of 24.3%. In the neighbouring countries, recent researches have focused on ED: a study among Lebanese university students (7) using SCOFF scale found a prevalence of 31%. Worldwide, particularly in Western countries ED prevalence assessed using screening scales among undergraduate students was lower than found in this study in most of cases. So, in European countries, it was about 16% among university French students(46) and respectively about 20% and 19% in nurses and medical students in the United Kingdom(4). This prevalence was 19% in nursery students in Spain (47) and 12% in Poland students in a medical college (48). One study conducted among Greece undergraduate students has shown a prevalence of 40% (42).This high prevalence of ED may probably be due to the young age of students. In fact, although ED can occur in children and among women in their mid and later life years, it is usually a disease whose age onset is during adolescence after puberty (49-52). These mental disorders remain frequently undetected (17) and undertreated (11) among adolescents persisting at older ages, so that its cumulated prevalence among

undergraduate students is so high. The elevated level of stress as well as many other psychological problems can also explain this high prevalence , in fact the proportion of medical students suffering from these conditions has increased markedly (23,53) exposing them to a particular ED risk (54).

The current study also provides results about prevalence of two subclinical concerns: "body image" and "eating behaviour" strongly related to ED (55, 56) and that might benefit from preventive intervention in college setting. Approximately, 39% of students reported worrying about having lost control over how much they eat and approximately 28% reported believing themselves to be fat even though others say they are thin. In literature, the frequency of body dissatisfaction ranged from 22 to 34% (1,8) respectively among undergraduate students in the United States and in France healthcare students with a female predominance of these disorders (in the French sample 45% vs 24% and in the American sample 34% vs 9%). Concerning the fact of being worried about having lost control over how much they eat, this feeling was about 17% among American college students with persistent female predominance (26% vs 8%) (1). these two disordered eating behaviors are the main pathogens of ED and result both from the socio cultural pressure that maintains and amplifies ideal thinness by media, families and peers (57-59). The consequences of this socio-cultural pressure as weight stigma and weight discrimination increase the risk of many adverse consequences including ED (60) .These disorders were described in societies where food was plentiful and where thinness was desired. However, the poorer cultures in which the curvatures were valued seemed relatively freed from these disorders (61, 62). Nowadays, there are no more societies protected from disordered eating behaviors considering the globalization of culture thanks to the media and this affects all subcultures (63). So, children and adolescents are confronted each day with thinner silhouettes, which they identify as being the standard causing extreme weight control behaviors and ED (64-66). In our national context, because of the Mediterranean geographical position in the crossroads of Europe, Tunisia seems open to all these cultures and its young population adopt western model that idealizes thinness.

Factors associated with ED

Three factors associated with a high risk of disordered eating behaviors were detected in the multivariate analysis: 'female sex', 'previous dieting' and 'no repeat an academic year'. *"Female Sex"* was demonstrated in all studies as a strong predictor of eating disorders: so Garfinkel and Bushnel reported that male/female ratios range from 1:5 to 1:10 for both anorexia and boulimia nervosa (67,68), and a more recent study presented that prevalence of all ED is three to eight times higher in women than in men (69). This female vulnerability to ED was the concern of researchers who succeeded to establish several findings generating this high prevalence of disordered eating behaviors among women. Results of these researches suggested that female students' self-evaluation is predominantly based on the perception of one's own body (70). Moreover, women are more receptive to environmental factors and especially to socio-cultural pressures that idealize thinness and transmit images of threadlike silhouettes. Female students undertake, consequently, to compare their weight and shape and disliked their bodies to a larger extent than their male fellow students (71) and started extreme and dangerous weight-control practices causing ED. The second factor associated with eating disorder was *"Previous dieting "*, several studies among university students showed the same association. In fact, previous dieting was a risk factor strongly associated with a positive SCOFF in a study among healthcare students in Rouen university, France (a OR=4.70, 95%CI [1.72-3.45]) (8). According to a study conducted among high school students in Taiwan (72), the results of the 24-hour dietary recall showed that participants with disturbed eating behaviors had a lower level of nutritional intake than participants without ED. Therefore, having a diet is a consequence of extreme weight management practice because of weight and shape dissatisfaction that was highlighted as a significant predictor of dieting (73).

The third predictive factor of eating disorders was *"No repeat an academic year"*. Since educational status was not frequently studied as associated factor to ED, this finding is interesting given that it pointed out for the first time the role of academic status to generate ED. Some studies focused on ED found, in contrast to the present study, that weight-related behaviors including eating disordered behaviors and its associated risk factors (74,75), such unhealthful weight-control practices, are associated with poor school achievement.

Disordered eating behaviors were shown to be so highly prevalent among Tunisian health occupation students. Hence, this population needs an organized intervention strategy to reduce ED frequency and its various somatic and psychological comorbidities. The field of ED prevention has made rapid strides in the past two decades (76). Successful EDs' prevention programs typically focused on modifying specific factors known to confer greater risk for developing ED including: ideal-thinness internalization, perceived pressure to be thin, body dissatisfaction, self-reported dieting, and negative affectedness as depressive symptoms. These programs could be divided into one of three categories according to people risk status: universal, selected, and indicated. A recent publication (28) reviewed the evidence basis for nine successful programs that reduce existing ED pathology or prevent the onset of future pathology. These programs referred to a cognitive or behavioral theory to promote behavior and to change attitude including three essential approaches based on social cognitive theory, cognitive-behavioral or behavioral theory and cognitive dissonance theory. The analysis of the nine ED prevention programs showed the main topics covered in such of them. Most universal preventive programs included healthy eating nutrition typically addressed as a non-dieting approach (77-84), media literacy/socio cultural pressure (82-86) and body acceptance (77, 78, 82-86). Three other frequent topics were a part of universal programs such as moderate and healthy physical activity (77, 79-81, 87-91), education on healthy weight management (77) and self-esteem (77,78). Concerning the selected and indicated programs, the main topics included in these programs were healthy eating nutrition (91, 95), media literacy and socio-cultural pressure (89, 91, 92, 95, 96) and education on healthy weight management (92-96). However, the large majority of advances in ED prevention were the result of contribution almost exclusively of psychology and psychiatry disciplines. Whereas, there are not enough researches founded on public health approaches (29, 97). The main consequence of this extreme disciplinary concentration has led to an individually targeted prevention strategy with little research focused on macro-environmental level (98). The emergency of new macro-environmentally targeted initiatives have begun to emerge in the last few years such as a government-sponsored anti-dieting campaigns and legal bans on extremely 'ideal thin' in advertisements (99). Many public health actions

were implemented to encourage refusal to subscribe to excessively thin idealization. For instance, the British Fashion Council supported by the London Development Agency which mandated a report on the health status of fashion models including 14 recommendations on how to promote the health of models (100). Similar actions were made in Spain (101), Italy (102) and the United States (103) . In France (104) and Australia (105), actors have promoted healthy body image in societies at large. In spite of these public health prevention initiatives multitude, only one of them was evaluated: The Québec Charter for a Healthy and Diverse Body Image which outlining actions and principles undertaken by organizations and citizens to reduce media pressures favoring thinness. This Canadian action to prevent ED was viewed as potentially-influenced one (106).

In our national context, in order to deal with this societal burden of ED among university students, there is a compelling need to adopt an ED prevention approach taking into consideration topics of evidence-based programs and public health actions and which are the most adapted to our national health system, societal policies and culture specificities. As an approach to prevent ED in our national context, we suggest three types of interventions: first to establish preventive actions of various levels and departments allowing to realize this; second to promote research dealing with ED on a larger scale and finally to pay a particular attention to ED graduate training programs. Regarding the departments allowing the prevention of these disorders, infrastructures dealing with these problems are not currently available in our universities. As a first effective recommendation, it might prove necessary in the future to screen these disorders among all students in these faculties using SCOFF screen tool during future university medical visits. This universal approach would allow the screening of ED before the onset of its co-morbidities enabling earlier intervention probably reducing the complexity of treatment and greatly increasing the chances of full recovery. Students having great risk of ED, due to a positive screening tool or other predictive risk factor should benefit of psychological help by psychologist or psychiatrist in University Health Centers and not in psychiatry wards which are considered with mistrust because of the fear of stigmatization of having a mental disorder. ED preventing programs are required as well as awareness campaigns against these disorders. In Canada, for example ANEB (ANnorexie Et

Boulimie: Anorexia and Bulimia) organizes every year the 'ED awareness week' to answer needs of the participants in school setting and community worried about taking preventive actions and raising awareness about ED (107). In the absence of organizations objectifying ED prevention, in our national context, many manners by which students may be reached would be involved in these preventing programs: health academic services, residential life, extra-curricular activities and social networks. These campaigns will insist on modifying principal factors greatly related to ED such idealizing thinness and adopting unhealthy dieting.

Then there was a compelling need to promote more researches in ED in a larger scale allowing to light a shadow zone concerning the prevalence and associated factors to ED among all students and the Tunisian population in general. We need to evaluate at a later stage not only the effectiveness but also the cost of these prevention programs after their implementation. Finally, concerning graduate training programs it was shown that exposure to ED research is rare in public health graduate training programs (108) while it was missing in our national context. It is so strongly recommended to pay a particular attention to graduate training programs, which should concern University Doctors as well as managers of residency halls and universities. These training programs will aim at developing talented people able to deal with mental disorders including ED and shown to be a clear societal burden and a major public health problem.

Limitations

This study had some limitations. This can be related to the possibility of non-response bias, but this wouldn't be probably due to ED symptoms so that there is no difference between respondents and non-respondents concerning ED symptoms. Moreover, as eating distributed behaviors among students were self-reported, there could have been reporting information bias. However, since this questionnaire was completed anonymously this situation would be minimized. To mitigate selection bias we included, first, the three faculties: Medicine, Dentistry and Pharmacy in order to be able to extrapolate findings to all the health occupation students. For the same aim, we had chosen the three academic years as a tracer year from each cycle and we have diversified the places and the circumstances of collecting data: during

course, internship, in the library, in the hospital. For the choice and the validation of the SCOFF questionnaire, it is a screening tool and not a clinical diagnosis. However this instrument has demonstrated acceptable sensitivity and specificity for detecting probable cases of EDs in university non clinical populations (35). This questionnaire was not be trans-culturally validated, seen that Tunisian students speak French as a first foreign language and this questionnaire was already validated in a French speaking student population (35). To check the understanding of the SCOFF questionnaire, it was pretested and no misleading or uncertain questions were noted.

CONCLUSION

This study is among the largest researches aimed at ED in non-clinical samples both on national and regional levels. It showed a high prevalence of disordered eating behaviors among health occupation students, which was added to many others risky behaviors. According to these findings, there was an urgent need for monitoring these disorders and its associated factors, which can help to enable effective intervention programs.

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