

**Original Article**

## **Self-Reported Migraine and Health-Related Quality of Life of Greek Nursing Students: A Cross-Sectional Study**

**Theodoula Adamakidou**

RN, MSc, MHSA, PhD, Nursing Department, Postgraduate Program “Neurological Disorders –Evidence Based Practice”, University of West Attica, Athens, Greece,

**Eleni Papadamou, PT**

MSc, Postgraduate Program “Neurological Disorders – Evidence Based Practice”, Nursing Department, University of West Attica, Athens, Greece

**Eirini Grammatopoulou, PT, MSc, PhD**

Physiotherapy Department, University of West Attica, Athens, Greece

**Petros Papagiorgis, MD, PhD**

Biomedical Science Department, University of West Attica, Athens, Greece

**Sotirios Plakas, RN, MSc, PhD**

Nursing Department, Postgraduate Program “Neurological Disorders – Evidence Based Practice”, University of West Attica, Athens, Greece

**Ourania Govina, RN, MSc, PhD**

Nursing Department, Postgraduate Program “Neurological Disorders – Evidence Based Practice”, University of West Attica, Athens, Greece

**Alexandra Koreli, RN, MSc, PhD**

Nursing Department, University of West Attica, Athens, Greece

**Chysoula Tsiou, RN, PhD**

Nursing Department, Postgraduate Program “Neurological Disorders – Evidence Based Practice”, University of West Attica, Athens, Greece

**Correspondence:** Theodoula Adamakidou 28, Agiou Spyridonos str, 12243, Egaleo, Greece e-mail: thadam@uniwa.gr

### **Abstract**

**Background.** Migraine is unquestionably a serious cause of dysfunction.

**Objective.** To investigate the prevalence and impact of migraine on the health-related quality of life in Greek nursing students.

**Methods.** Cross-sectional study with 140 nursing students in their 3rd or 4th year of studies. The research tools used were the ID Migraine™ questionnaire, the Migraine Assessment Disability questionnaire, the Medical Outcomes Study questionnaire (SF-36) and a demographics and history of headache form.

**Results.** Self-reported migraine was found to be at 43.6%, self-reported migraine with physician-confirmed diagnosis was at 16.4%, and migraine detected by ID Migraine™ was at 48%. The main trigger factors of migraine were not sleeping at night, fasting for many hours and stress. Males showed a lower degree of migraine-related disability and better mental health. Students with a negative ID Migraine™ had a better health-related quality of life. The self-reported social health score of nursing students was much worse compared to standardized reference scores for the general population in Greece.

**Conclusions.** Preventing migraine and improving students’ health-related quality of life should involve a variety of interventions such as psychosocial support and health promotion, stress management, as well as healthy sleeping and eating habits.

**Key words:** Nursing students; Migraine; migraine student HRQoL; social health of nursing students; Migraine-related disability

## Introduction

Migraine is most likely the worst form of headache that healthy people are experiencing. Its effects on students involves difficulties in education and academic performance (Abdur R., 2021). The prevalence of migraine among students vary greatly among studies. In Kuwait (Al-Hashel, Ahmed, Alroughani et al., 2014) was measured at 27.9%, in the USA (Johnson, Guhl, Arora et al., 2014) at 25.5%, in India (Menon & Kinnera, 2013) at 28%, in Pakistan at 21%, in China at 9% (Wang, Sun, Xing et al., 2015) and in Ethiopia (Birru, Abay, Abdelwuhab et al., 2016) at 13.06%. The observed predominance of migraine prevalence in female students (Birru et al., 2016; Johnson et al., 2014; Menon & Kinnera, 2013) is associated with a higher prevalence of depression in students (Desouky, Zaid & Taha, 2019).

Migraine has detrimental effects on sufferers' life, it affects overall life, career, family, social life, cognitive and emotional functioning as well as occupational and economic levels (Estave, Beeghly, Anderson et al., 2021). Research in the general population has shown that people with migraine and mild to severe migraine-related disability had a worse health-related quality of life (HRQoL) (Lipton, Liberman, Kolodner et al., 2003).

Qualitative research has documented the effects of migraine on the lives of migraine patients and states that migraine contributes to fear, isolation, frustration, guilt, internalized and externalized stigma due to devastating pain and expected stress (Estave et al., 2021).

The present study was performed to fill a gap in the literature regarding studies on HRQoL of nursing students with migraine in Greece. The aim of this study was to determine the HRQoL in Greek nursing students suffering from migraine. Specific targets of the study were (1) the detection of the prevalence of migraine, (2) the evaluation of migraine-related disability and (3) the evaluation of the HRQoL of nursing students

## Methods

**The study sample:** The sample of this cross-sectional study consisted of students in their 3rd and 4th year of studies at the Nursing Department of the university BLINDED, Greece, in the academic year

2019-2020. Of the 145 students who responded to a meeting invitation, 140 finally agreed to participate in the research (participation rate 96.5%). The inclusion criteria were: being a student of the Nursing Department of the university BLINDED consenting to participate in the study.

**Data collection:** On February 25, 2020, before the beginning of the first Sars-cov-2 quarantine in Greece, the students arrived at a university class for a prearranged briefing with their professor. First, they were informed about the aim of the study by the professor, then the professor left the classroom and then a postgraduate student who did not know the students distributed and collected the questionnaires, which were completed anonymously.

**Measures:** Participants completed the demographic data and Individual Headache History which included 10 questions. Following they completed the ID Migraine™ that is a short, self-reported questionnaire (Lipton, Dodick, Sadovsky et al., 2003) which has emerged as a successful migraine screening and detection tool (Wang et al., 2015). The diagnostic accuracy of the ID Migraine™ has been quantified in previous studies (Lipton, Bigal & Stewart, 2003).

**The ID Migraine™:** Is already used in Greece. It consists of the following three questions answered with "YES" or "NO": 1. Did you feel nauseated or sick when you had a headache? 2. Did the light bother you (a lot more than when you didn't have a headache)? 3. Did your headache limit your ability to work, study or do what you wanted, for at least one day? The ID Migraine™ is considered positive when at least 2 of the questions are answered "YES".

**The Migraine Assessment Disability questionnaire (MIDAS):** Is a self-administered tool to measure the degree of migraine-related disability in the previous three months (Stewart, Lipton, Dowson et al., 2001). The sum of the migraine days of the last three months in questions 1 to 5 is the overall MIDAS score, which ranges from 0 to 90 and is used to categorize patients into grades I to IV. More specifically, grade I means little or no disability in people with total migraine days from 0 to 5; Grade II means low disability in people with total migraine days from 6 to 10 days; Grade III means moderate disability in people with

total migraine days from 11 to 20 days; while a total  $\geq 21$  indicates a high level of disability (grade IV). The Greek version of MIDAS is a reliable and valid tool for assessing migraine-related disability in Greek sample, with high internal consistency ( $\alpha=0.82$ ) (Oikonomidi, Vikelis, Artemiadis et al., 2018).

**The Medical Outcomes Study Questionnaire Short Form 36 (SF-36)** was used for HRQoL self-assessment (Ware & Sherbourne, 1992). It consisted of 36 questions which measure the following eight HRQoL domains: physical functioning (PF), role limitations due to physical problems (PR), bodily pain (PP), general health (GH), vitality (VT), social functioning (SF), role limitations due to emotional problems (RE) and mental health (MH). The Greek version of the SF-36 is a reliable and valid tool for assessing HRQoL, with high internal reliability (Cronbach  $\alpha=0.79-0.95$ ) (Pappa, Kontodimopoulos & Niakas, 2005).

**Ethics:** The present study was approved by the Departmental Review Board of the Nursing Department of the BLINDED University (Ref no. 10/30-7-2019) and was developed in accordance with the Helsinki Declaration and the General Data Protection Regulation (EU) 2016/679. Permissions were also obtained from the creators of the questionnaires.

**Statistical analysis:** The Statistical Package for Social Sciences (IBM Statistical Package for Social Sciences) version 25 was used for statistical analysis of the data. The Mann-Whitney U-test was performed to investigate differences in migraine-related disability and health between males and females and between students with and without migraines. In addition, the chi-square test was performed to investigate the frequency differences in HRQoL domains between male and female students and between migraine and non-migraine students.

The HRQoL domains were defined as dependent variables and migraine and gender were defined as independent variables. The significance level ( $p$ ) was set to 0.05 or less.

## Results

### ***Descriptive Statistics of the Individual Headache History, the ID Migraine™ and the MIDAS Questionnaire***

The participants were mostly women (117, 83.6%), in the 3rd or 4th year of their first degree in nursing

studies (76.4%), and were aged over 21 years (mean 24.5 years). Self-reported headache had a prevalence of 69.3%, self-reported migraine was 43.6%, while self-reported migraine with self-reported physician-confirmed diagnosis of migraine was 16.4%. Of the 61 students with self-reported migraine, 14 (23%) had  $\geq 4$  migraine days per month, but none exceeded 12 days. The main trigger factors of migraine were specified in the questionnaire. The 2 main trigger factors that were stated were a lack of sleep/being awake overnight (83.6%) and food deprivation for many hours (82%). Females voluntarily added “stress” (43.4%) in the “other cause” field (Table 1).

Based on the ID Migraine™, 48.5% of students suffered from migraine. Sixty-nine of the 140 students stated that they did not have migraines and 69 students tested negative according to the ID Migraine™ questionnaire. The MIDAS questionnaire was completed by all 140 participants, of whom 73 (52.1%) had a MIDAS score indicating more than 6 days with migraine in the previous 3 months.

### ***Migraine-related Disability in Students***

According to the ID Migraine™, 45.5% of male students and 49.1% of female students had migraine. MIDAS Questionnaire chi-square test has shown that males suffering from little or no disability (grade I) compared to females who predominate to the other grades (II, III and VI) of disability ( $p < 0,05$ ) (Table 2).

### ***Students' HRQoL***

Descriptive statistics of SF-36 domains are shown in Table 3. A comparison between the SF-36 domain scores in the present study and those in 2 Greek general population studies (Pappa et al., 2005; Tountas, Filippidis, Gouveri et al., 2007) is shown in Figures 1 and 2. More specifically, it was found that nursing students had higher scores than the general Greek population in the PF domain (nursing students PF=87.23, general population studies PF=82 and 80.76, respectively) and the BP domain (nursing students BP=77.50, general population studies BP=77.24 and 72.98, respectively). Nursing students had also much lower scores in SF (68.71 vs 81.53 and 82.05) and RE (60.02 vs 81.86 and 81.53). It is worth noting that the self-reported health of students with migraine was much lower

compared to the general Greek population in all health dimensions of SF-36 (Figure 2).

Table 4 shows the differences in nursing students' SF-36 domain scores between males and females, and between people with a positive and those with a negative ID Migraine™. The male students had significantly higher scores at MH domain, indicating better mental health compared to female students ( $U=855.00$ ,  $p<0.05$ ). In addition, those with a positive ID Migraine™ had significantly ( $p<0.05$ ) lower scores in all SF-36 domains compared to those with a negative ID Migraine™,

with the exception of the VT domain which showed only marginal significance ( $p=0.053$ ).

Figure 3 shows the difference in SF-36 domain scores between individuals with positive and negative ID Migraine™. The RP domain had the highest score for those who had a negative test ( $RP=83.77$ ), and the lowest and worst score for those who had a positive test ( $RP=50.23$ ).

Finally, Figure 4 shows the difference in the SF-36 domain scores between males and females. In general, males had higher scores at MH and the others domains, with the exception of the PF dimension.

**Table 1. Participants descriptive statistics**

<b>Demographic characteristics</b>		<b>N</b>	<b>%</b>
Gender (n=140)	male	23	16.4
	female	117	83.6
Age (n=140) mean 24.5 years (min=21, max=58 years)	21 & 22*	88	62.9
	≥23	53	37.1
Year of studies (n=140)	3 <sup>o</sup>	107	76.4
	≥ 4 <sup>o</sup>	29	20.7
	Not mentioned	4	2.9
<b>Personal headache history</b>			
Self-reported headache (n=140)	Yes	97	69.3
Self-reported migraine (n=140)	Yes	61	43.6
Self-reported migraine with physician-confirmed migraine diagnosis (n=61)	Yes	10	16.4
	No	51	83.6
ID Migraine™ (n=140)	Positive	65	48.5
<b>Monthly migraine days (n=61)</b>	0- 3	38	62.3

	≥ 4 - 12	14	23
	≥13	0	0
	Not mentioned	9	14.7
Number of days lost due to headache in the last 3 months (MIDAS) (n=140)	0-5 days	67	47.9
	≥ 6 days	73	52.1
<b>Personal headache history by gender</b>			
Self-reported headache (n=132, male:23/ female:109)	Male	12	52.2
	Female	85	78
Self-reported migraine (n=134, male:22/female:112)	Male	8	36.4
	Female	53	47.3
Self-reported migraine and physician - confirmed migraine diagnosis (n=61, male:8/ female:53)	Male	1	12.5
	Female	9	17
Self-reported migraine <b>and no physician-confirmed migraine diagnosis</b> (n=61, male:8/female:53)	Male	7	87.5
	Female	44	83
Positive ID Migraine™ (n=65)	Male	10	45.5
	Female	55	49.1
Negative ID Migraine™ (n=69)	Male	12	54.5
	Female	57	50.9
<b>Monthly migraine</b> 0-3 days (n=61, male:8/ female:53)	Male	4	50
	Female	33	62.26
<b>Monthly migraine</b> 4-12 days (n=61, male:8/ female:53)	Male	2	25
	Female	12	22.64
	Male	16	69.6

<b>Lost 0-5 days</b> due to headache in the last 3-months (MIDAS) (n=140, male:23/ female:117)	Female	51	43.6
<b>Lost <math>\geq</math> 6 days</b> due to headache in the last 3-months (MIDAS) (n=140, male:23/ female:117)	Male	7	30.4
	Female	66	56.4
<b>Main cause of onset of migraine in 61 students with self-reported migraine</b>			
Do not sleep at night / overnight	Yes	51	83.6
Food deprivation for many hours	Yes	50	82
Other cause: mentioned only by female	Stress	23	43.4

\* typical year of graduation

**Table 2. Migraine and grades of migraine-related disability between males and females**

	Male		Female		$\chi^2$	df	p
	n	%	n	%			
<b>ID Migraine™</b>							
Positive	10	45.5	55	49.1	0.1	1	> 0.05
Negative	12	54.5	57	50.9			
Total	22	100	112	100			
<b>Grades of migraine-related disability MIDAS</b>							
Grade I	16	69.6	51	43.6	5.4	3	< 0.05
Grade II	2	8.7	24	20.5			
Grade III	4	17.4	30	25.6			
Grade IV	1	4.3	12	10.3			
Total	23	100	117	100			

MIDAS: Migraine Assessment Disability Questionnaire

**Table 3. Descriptive statistics of SF-36 domains**

<b>SF-36 Domains</b>	<b>Mean ± SD</b>	<b>Median (IQR)</b>	<b>Range</b>
<b>PF</b>	87.23±17.71	95.00 (15)	0-100
<b>RP</b>	72.20±35.83	100.00 (50)	0-100
<b>BP</b>	77.50±20.71	77.50 (35.50)	22.50-100
<b>GH</b>	60.00±17.85	60.00 (25.00)	5-95
<b>VT</b>	58.40±17.75	60.00 (25)	6.67-100
<b>SF</b>	68.71±21.09	75.00 (37.50)	12.5-100
<b>RE</b>	60.02±40.25	66.67 (66.67)	0-100
<b>MH</b>	60.16±18.85	60.00 (22)	12-100

Abbreviations: PF – Physical Function; RP – Role Physical; BP – Bodily Pain; GH – General Health; VT – Vitality; SF – Social Functioning; RE – Role Emotional; MH – Mental Health, IQR: interquartile range

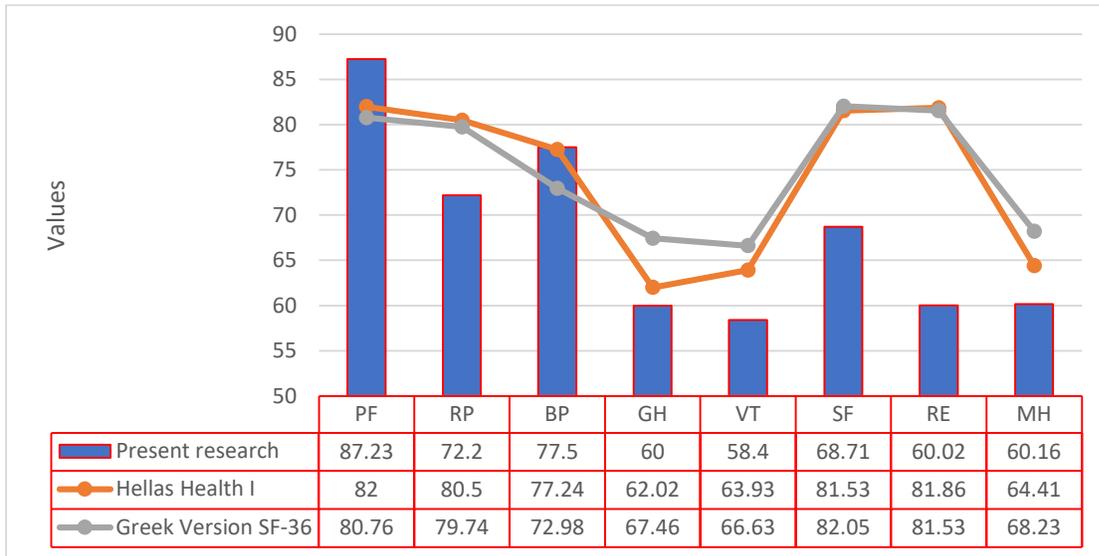
**Table 4. Health-related quality of life (SF- 36) of nursing students: Differences a) between male and female and b) between students with positive and negative ID Migraine™**

SF-36 domains	Males		Females		Mann–Whitney U-test	p	Positive ID Migraine™		Negative ID Migraine™		Mann–Whitney U-test	p
	Median (IQR)	Mean Rank	Median (IQR)	Mean Rank								
<b>PF</b>	95.00 (30.00)	70.87	95.00 (15.00)	70.43	1337.000	0.960	90.00 (30.00)	56.60	100.00 (12.50)	77.77	1534.000	<b>0.001</b>
<b>RP</b>	100.00 (25.00)	78.13	100.00 (50.00)	69.00	1170.000	0.282	62.50 (75.00)	50.23	100.00 (0.00)	83.77	1120.000	<b>0.000</b>
<b>BP</b>	77.50 (42.50)	77.85	77.50 (35.00)	67.83	1130.500	0.270	68.75 (25.00)	53.68	80.00 (35.00)	78.20	1366.000	<b>0.000</b>
<b>GH</b>	65.00 (15.00)	79.35	60.00 (30.00)	68.76	1142.000	0.251	60.00 (28.75)	60.71	65.00 (25.00)	73.90	1801.000	<b>0.048</b>
<b>VT</b>	65.00 (25.00)	82.61	60.00 (25.00)	67.50	1044.000	0.990	55.00 (28.00)	60.30	65.00 (24.00)	73.21	1779.500	<b>0.053</b>
<b>SF</b>	65.00 (25.00)	77.48	68.75 (37.50)	68.52	1162.000	0.322	62.50 (25.00)	58.66	75.00 (25.00)	74.73	1674.500	<b>0.015</b>

<b>RE</b>	66.67 (66.67)	70.87	66.67 (66.67)	69.23	1291.000	0.850	33.34 (100.00)	55.44	100.00 (66.67)	76.59	1477.000	<b>0.001</b>
<b>MH</b>	72.00 (20.00)	90.83	60.00 (28.00)	65.87	855.000	<b>0.006</b>	56.00 (20.00)	53.92	72.00 (28.00)	79.13	1371.000	<b>0.000</b>

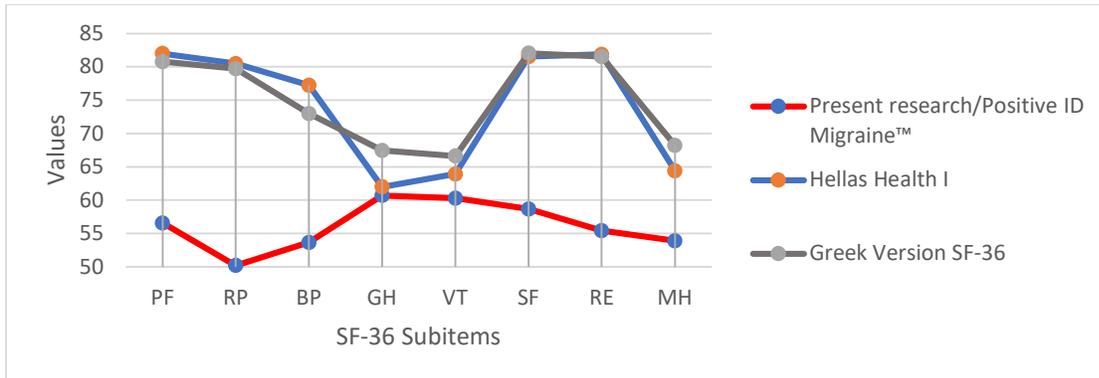
Abbreviations: PF – Physical Function; RP – Role Physical; BP – Bodily Pain; GH – General Health; VT – Vitality; SF – Social Functioning; RE – Role Emotional; MH – Mental Health, IQR: interquartile range

**Figure 1. Comparison between SF-36 domains scores in the present study and standardized SF-36 domain scores of the general Greek population**



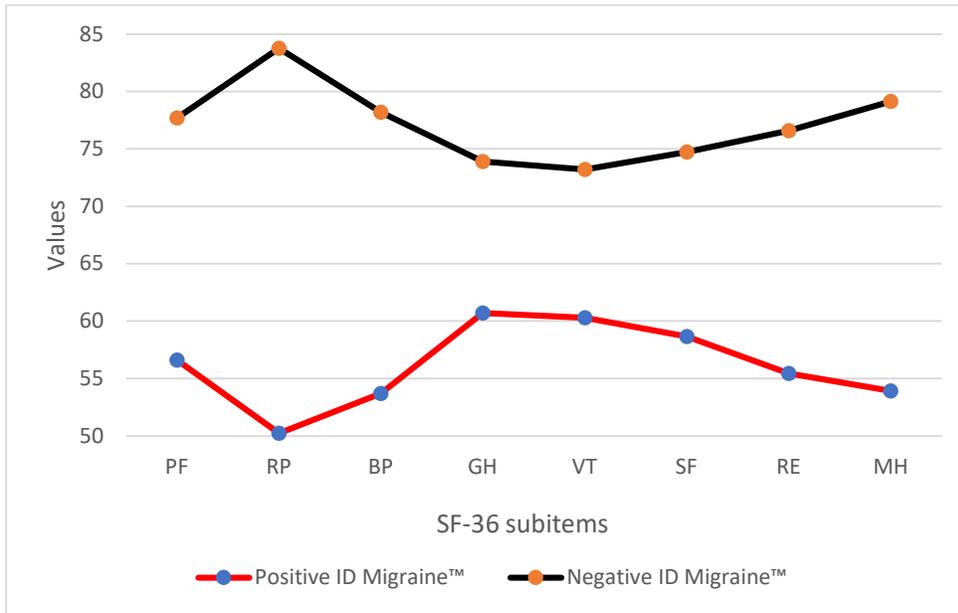
Abbreviations: PF – Physical Function; RP – Role Physical; BP – Bodily Pain; GH – General Health; VT – Vitality; SF – Social Functioning; RE – Role Emotional; MH – Mental Health. Source of standardized scores: Tountas et al (2007), Pappa et al. (2005).

**Figure 2. Comparison between SF-36 domain scores of students with positive ID Migraine™ and standardized SF-36 domain scores of the general Greek population**



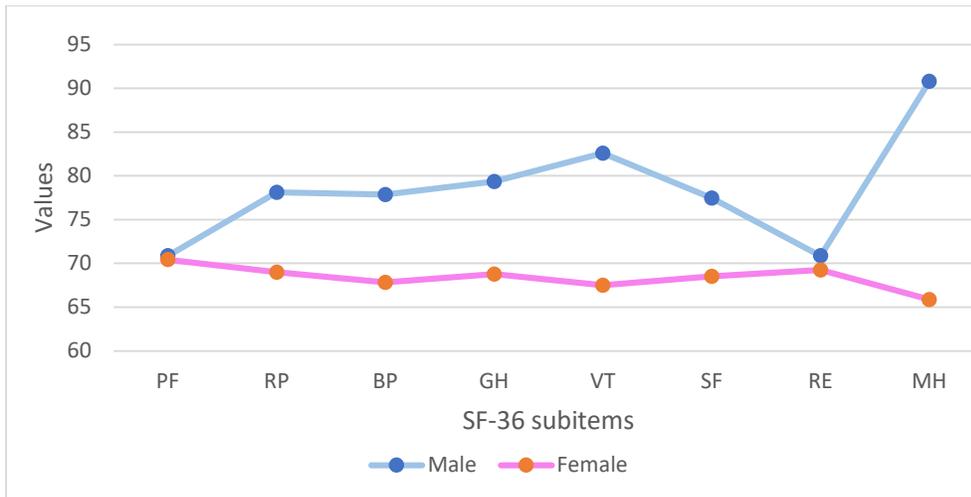
Abbreviations: PF – Physical Function; RP – Role Physical; BP – Bodily Pain; GH – General Health; VT – Vitality; SF – Social Functioning; RE – Role Emotional; MH – Mental Health. Source of standardized scores: Tountas et al (2007), Pappa et al. (2005).

**Figure 3. Comparison between SF-36 domain scores of students with negative and positive ID Migraine™**



Abbreviations: PF – Physical Function; RP – Role Physical; BP – Bodily Pain; GH – General Health; VT – Vitality; SF – Social Functioning; RE – Role Emotional; MH – Mental Health.

**Figure 4. Comparison between SF-36 domain scores and gender**



Abbreviations: PF – Physical Function; RP – Role Physical; BP – Bodily Pain; GH – General Health; VT – Vitality; SF – Social Functioning; RE – Role Emotional; MH – Mental Health.

## Discussion

Headaches and migraines are pathological conditions with multifactorial etiology (Desouky et al., 2019; Noor, Sajjad & Asma, 2016; Wang et al., 2015). This cross-sectional study confirmed the hypothesis that lack of sleep/being awake overnight and food deprivation for many hours were the main trigger factors of migraine ( $\geq 82\%$ ). This finding is confirmed by similar research on health profession students and points to the need for healthier lifestyles (Menon & Kinnera, 2013; Johnson et al., 2014; Noor et al., 2016; Abdur R., 2021; Anaya, Alia, Hamoudeh et al., 2022).

In the present study female students voluntarily added stress as a trigger factor of migraine (37.7%) which has also been suggested by previous researchers as a major cause of migraine (Menon & Kinnera, 2013; Johnson et al., 2014; Noor et al., 2016; Abdur R., 2021; Anaya et al., 2022). Studies have shown that stress in health profession students is related to patient care, workload and negative interactions with school staff (Labrague, McEnroe-Petitte, Gloe et al., 2017) as well as the fear of becoming seriously ill (Papadopoulou, Koureas, Farmakis et al., 2021). For these reasons, stress management strategies has been recommended for migraine nursing students (Ibrahim, Alotaibi, Alhazmi et al., 2017).

### ***“Translating” the Prevalence of Migraine in Students***

It was found that about two thirds of the self-reported headaches were migraines, and that the prevalence of migraine ranges from 16.4% to 48.5%. More specifically, the prevalence of self-reported migraine was 43.6%, whereas only 16.4% of the participants claimed a physician-confirmed diagnosis of migraine. The rate detected by ID Migraine™ was 48.5% and exceeded that of self-reported migraine. These findings demonstrate that different research methods and tools lead to results with significant heterogeneity (Wang, Zhou, Sun et al., 2016). In the international literature, the

prevalence of migraine in students ranges from 10% to 35% (Menon & Kinnera, 2013; Noor et al., 2016; Wang et al., 2016). However, it is argued that the true prevalence of migraine in the general population may be significantly higher, and that any lower scores are due to under-reporting (Evers, Brockmann, Summ et al., 2020; Yeh, Blizzard & Taylor, 2018). The present study found a greater prevalence of migraine than studies in students from other countries (Abdur R., 2021; Oraby, Soliman, Mahmoud et al., 2021; Anaya et al., 2022; Noor et al., 2016; Johnson et al., 2014; Menon & Kinnera, 2013). In a literature review that combined 56 independent studies and analyzed data from 34,904 students in total, the cumulative analysis showed that migraine is very common in university students and that the cumulative prevalence was 16.1% in males and 21.7% in females (Wang et al., 2016).

Regarding the factors affecting health and education, it has been reported that in lower income groups the incidence of headaches is higher (Stewart, Lipton, Celentano et al., 1992) and that family income has been reported as the main limiting factor in completing nursing studies (Priode, Dail & Swanson, 2020) and an important predictor of students' quality of life (Cruz, Felicilda-Reynaldo, Lam et al., 2018). In 2019, 30% of the Greek population was at risk of poverty or social exclusion, a percentage much higher compared to other Eurozone countries (Hellenic Statistical Authority, 2019). Completing a university course can be difficult for Greek students, as it is accompanied by financial difficulties and study stress (Manti, Mastrogiannis, Mantzourou et al., 2022) and a very low annual family income (Vlachou, Owens, Lavdaniti et al., 2019). Thus, our findings may reflect the impact of poverty on the late completion of nursing studies, on the onset of migraine, and on the general quality of life of our students (Priode et al., 2020; Stewart et al., 1992).

Although many researchers claim that migraine is associated with gender and is more common

in women (Johnson et al., 2014; Wang et al., 2016; Abdur R., 2021), in our study it is impossible to determine this with any certainty. It was found that female students had more severe illness and significantly higher migraine-related disability than males. In particular, women experience longer migraines, are more likely to suffer recurrence of seizures, and require a longer period of time until the recovery phase (Johnson et al., 2014; Oraby et al., 2021).

In the present study, the direct question: "Do you have migraines?", yielded a lower prevalence of migraine compared to the ID Migraine™ (43.6% vs 48.5%). This difference may be related to the stigma of the disease and its consequent concealment, which have been documented in migraine students (Parikh, Kempner & Young, 2021), the vast majority of whom hide its existence from faculty members (80.9%), even when undergoing interviews for the purpose of application for residency (Johnson et al., 2014).

### ***Interpreting the lack of medical diagnosis in migraine***

The present study did not detect students with chronic migraine. However, during the previous 3 months, 52.1% of the participants were absent from activities for more than 6 days because of headaches: therefore, regardless of the type of headache, they certainly needed medical help. However, only 10 of the 61 students with self-reported migraine (16.4%) and positive ID Migraine™ stated a physician-confirmed diagnosis. This percentage is much lower compared to other similar studies (Johnson et al., 2014; Menon & Kinnera, 2013; Oraby et al., 2021) but might be expected in light of a recent Greek study (Constantinidis, Arvaniti, Fakas et al., 2021).

It is argued that migraine is very often associated with delayed diagnosis and misdiagnosis (Rai, Bitswa, Singh et al., 2019). In addition, the lack of a physician-confirmed diagnosis in a population stating that they have

a migraine may indicate the lack of specialized headache services (Steiner, Jensen, Katsarava et al., 2021).

Although female students probably have better health literacy than males (Rababah, Al-Hammouri, Drew et al., 2019), and females also make greater use of health services in Greece (Hellenic Statistical Authority, 2019), the findings of this study, where the majority were females (117 / 83.6%), did not indicate any such differences, as only 9 of 55 female migraine sufferers reported a physician-confirmed diagnosis. The "non-physician-confirmed diagnosis" observed in the present study with a mean age population of 24.5 years indicates that headache may not be initially perceived by young people as a serious health problem (Müller, Dresler, Gaul et al., 2020). The observed low frequency of a physician-confirmed diagnosis of migraine, in combination with the rest of our findings, shows either that the actual prevalence of migraine in nursing students is at least 16.4%, or that there is a refusal to seek medical help. Previous studies have shown that students with migraine, resist receiving help, and that a high proportion of those with frequent and/or severe migraines do not receive treatment from health professionals (Desouky et al., 2019; Johnson et al., 2014; Menon & Kinnera, 2013; Oraby et al., 2021; Wang et al., 2015). Similarly, in the present study 83.6% of students with migraine also reported no professional care, and this may have negatively affected their daily life and quality of life, as shown by the low quality of life scores in this and previous studies (Johnson et al., 2014; Menon & Kinnera, 2013).

In the present study, the low frequency of physician-confirmed diagnosis of migraine and the low social and mental health scores may reflect a profound and negative effect of migraine stigma on self-care (Parikh et al., 2021; Estave et al., 2021). It is already known that 43% of people with headaches stated that they feel "bad/ashamed" because of a headache (Constantinidis et al., 2021), 72% of migraine

patients experience the stigma of the disease (Koseahmet, Polat, Gozubatik-Celik et al., 2022) and that the internalized stigma has a detrimental effect on the patient's quality of life (Estave et al., 2021; Parikh et al., 2021).

Based on all our findings and the literature, we can assume that most students with migraine in the present study did not seek medical help, and probably just began a long journey—which according to the literature may take as long as 17 years—to reach a professional therapist specializing in headache (Peres, Swerts, de Oliveira et al., 2019). Therefore, there is a great need to support these students in their self-care (Parikh et al., 2021), to establish headache services (Steiner et al., 2021) and improve primary health care, which remains the most sought-after healthcare reform in Greece (Souliotis, Tsimitsiou, Golna et al., 2019).

**HRQoL of students:** The comparison of SF-36 scores with previous standardized SF-36 scores in a stratified sample of the general population in Greece (Pappa et al., 2005; Tountas et al., 2007) showed that the self-reported physical health of nursing students, according to current research, is better than the self-reported physical health of the general population. As the students' mean age was only 24.5 years, better physical health is expected (Cruz et al., 2018). For all other health dimensions of SF-36, our students' scores were lower compared to the scores of the general population, especially in the SF and RE domains.

According to the interpretation of the SF-36 scale, the low score for SF and RE observed in this study indicate that nursing students faced many difficulties in normal social activities due to physical and emotional health problems, they were not capable for satisfactory interpersonal relationships with others and that these students faced many difficulties with work or other daily activities as a result of emotional illness (Pappa et al., 2005). Previous qualitative study in nursing students has shown that students' social

health is affected during clinical placement (Tam, Mao, Cheong et al., 2020). A descriptive study of nursing students in nine countries (Chile, Egypt, Greece, Hong Kong, India, Kenya, Oman, Saudi Arabia and the United States) also showed better self-reported physical health and at the same time worse self-reported social and emotional health (Cruz et al., 2018).

A recent Australian study showed that female nursing students had lower HRQoL scores (94.5%) than the general population (Heidke, Vandelanotte, Irwin et al., 2021). In our study males had better health compared to females only in MH domain, a finding which was also confirmed by measurements in the Greek general population where the prevalence of anxiety disorders and depression was clearly lower for males (Hellenic Statistical Authority, 2019). There is evidence that differences observed between countries in the quality of life of nursing students are related to various social factors (Torres & Paragas, 2019).

In the present study 23% of students with self-reported migraine had  $\geq 4$  monthly migraine days and as expected students with a positive ID Migraine™ had very low quality of life values. It should be mentioned that the VT domain differed marginally between positive and negative students ( $p = 0.053$ ). A study in Canadian adolescents with self-reported migraine also showed a low self-reported quality of life (SF-36), but adolescents' perceptions of their VT were not affected (Brna, Gordon & Dooley, 2008). Our finding of the marginal difference in VT shows that this may be the only SF-36 domain that is affected during the headache, or improved after the headache has passed. This point should be considered in the planning of future studies so that participants can state whether they are currently in pain or have a migraine aura. The observed low scores in the RP domain in nursing students in the present study show the detrimental effect on migraine on daily activities (Pappa et al., 2005).

The findings of this study are in concordance with the international literature regarding the severity of migraine-related disability and its effect on students' quality of life, which diminishes considerably, as there are days where they cannot follow everyday life rhythms in various areas of their lives (Al-Hashel et al., 2014; Menon & Kinnera, 2013). In the present study the consequences of migraine disability at studies were clear as 52.1% of our students reported that they had lost more than 6 days of work or school in the previous quarter because of a headache (MIDAS). A recent study in students showed that there is a statistically significant positive correlation between migraine frequency, migraine severity, and poor academic performance (Oraby et al., 2021). It was also mentioned that migraine-related disability is associated with absenteeism, reduced productivity (62.7%), unsuccessful attempts to study (Johnson et al., 2014), withdrawal from both academic and non-academic activities as well as from family and friends (Noor et al., 2016), performance difficulties, and a general belief that despite the pain they should continue to attend educational lectures even during migraine episodes (Estave et al., 2021; Johnson et al., 2014). Given that migraine affects student performance, an indirect conclusion is that the observed delayed completion of studies in this study may be related to the increased prevalence of migraine, or vice versa. As the effects of migraine on the quality of life of sufferers are significant, the need to design strategies to improve conditions for patients with similar disorders is further emphasized (Birru et al., 2016).

**Limitations:** The limitations of this study should be mentioned. This study recruited 140 nursing students from a single center, so it is not possible to generalize the findings to the population of all nursing students in the country. Another limitation is the small proportion of male participants, which calls into question the value of the observed health differences between the males and females in the sample. The use of self-reported questionnaires, scales and data, are known to indicate perceptions

rather than the real problem. Finally, another limitation is the comparison of the SF-36 findings of this study with scores from previous SF-36 studies in the general Greek population, which provide values that are only indicative and not completely representative. Thus, the conclusions from this comparison should be viewed with caution.

**Conclusion:** To conclude, in this study there is evidence that the prevalence of migraine in nursing students is probably higher than in previous studies and that female students experience a higher migraine-related disability and generally have more vulnerable mental health. The HRQoL of students, and especially those who suffer migraines, is clearly degraded. Based on the above findings, it is recommended (a) to establish a headache clinic with a physician specialized in headache, and (b) to provide medical examinations of the student population, with a view to drawing sounder conclusions that can lead to substantive and specific interventions. To protect the health of students and prevent migraines, health promotion is recommended, with emphasis on sleep hygiene, diet hygiene and stress prevention. Students' social and emotional health should also be considered and supported.

## References

- Abdur R., T. S., Yeasin A., Abhishek K., Showsan Kc., Benazir J., Meherab H., Mahamoda S., Md. Golam H. (2021). Prevalence of Migraine and Its Associated Factors among Medical Students of Bangladesh: A Cross Sectional Study. *MedRxiv*. <https://doi.org/10.1101/2021.09.04.21263129>
- Al-Hashel, J. Y., Ahmed, S. F., Alroughani, R. & Goadsby, P. J. (2014). Migraine among Medical Students in Kuwait University. *Journal of Headache and Pain*, 15, 26. 10.1186/1129-2377-15-26
- Anaya, F., Alia, A., Hamoudeh, F., Nazzal, Z. & Maraqa, B. (2022). Epidemiological and Clinical Characteristics of Headache among Medical Students in Palestine: A Cross Sectional Study. *BMC Neurology*, 22, 1-8. <https://doi.org/10.1186/s12883-021-02526-9>
- Birru, E. M., Abay, Z., Abdelwuhab, M., Basazn, A., Sirak, B. & Teni, F. S. (2016). Management of Headache and Associated Factors among Undergraduate Medicine and Health Science Students of University of Gondar, North West Ethiopia. *Journal of Headache and Pain*, 17, 1-9.

- Brna, P., Gordon, K. & Dooley, J. (2008). Canadian Adolescents with Migraine: Impaired Health-Related Quality of Life. *Journal of Child Neurology*, 23, 39-43. doi: 10.1177/0883073807307987
- Constantinidis, T. S., Arvaniti, C., Fakas, N., Rudolf, J., Kouremenos, E., Giannouli, E. & Mitsikostas, D. D. (2021). A Population-Based Survey for Disabling Headaches in Greece: Prevalence, Burden and Treatment Preferences. *Cephalgia*, 41, 810-820. 10.1177/0333102421989630
- Cruz, J. P., Felicilda-Reynaldo, R. F. D., Lam, S. C., Contreras, F. a. M., Cecily, H. S. J., Papathanasiou, I. V., Fouly, H. A., Kamau, S. M., Valdez, G. F. D. & Adams, K. A. (2018). Quality of Life of Nursing Students from Nine Countries: A Cross-Sectional Study. *Nurse Education Today*, 66, 135-142. doi: 10.1016/j.nedt.2018.04.016.
- Desouky, D. E., Zaid, H. A. & Taha, A. A. (2019). Migraine, Tension-Type Headache, and Depression among Saudi Female Students in Taif University. *Journal of the Egyptian Public Health Association*, 94, 1-9. doi: 10.1186/s42506-019-0008-7
- Estave, P. M., Beeghly, S., Anderson, R., Margol, C., Shakir, M., George, G., Berger, A., O'connell, N., Burch, R. & Haas, N. (2021). Learning the Full Impact of Migraine through Patient Voices: A Qualitative Study. *Headache*, 61, 1004-1020. doi: 10.1111/head.14151
- Evers, S., Brockmann, N., Summ, O., Husstedt, I. W. & Frese, A. (2020). Primary Headache and Migraine in Headache Specialists—Does Personal History of Doctors Matter? *Cephalgia*, 40, 96-106. <https://doi.org/10.1177/0333102419873671>
- Heidke, P., Vandelanotte, C., Irwin, C., Williams, S., Saluja, S. & Khalesi, S. (2021). Associations between Health-Related Quality of Life and Health Behaviors in Australian Nursing Students. *Nursing & Health Sciences*, 23, 477-489. <https://doi.org/10.1111/nhs.12832>
- Hellenic Statistical Authority. 2019. *Health Interview Survey (His) & (Eu-Silc)* [Online]. Greece. Available: <https://www.statistics.gr/> [Accessed 07 Dec 2021].
- Ibrahim, N. K., Alotaibi, A. K., Alhazmi, A. M., Alshehri, R. Z., Saimaldaher, R. N. & Murad, M. A. (2017). Prevalence, Predictors and Triggers of Migraine Headache among Medical Students and Interns in King Abdulaziz University, Jeddah, Saudi Arabia. *Pakistan Journal of Medical Sciences* 33, 270. doi: 10.12669/pjms.332.12139
- Johnson, H., Guhl, G., Arora, J. & Walling, A. (2014). Migraine in Students of a Us Medical School. *Family Medicine*, 46, 615-619.
- Koseahmet, F. B., Polat, B., Gozubatik-Celik, R. G., Baytekin, I., Soyulu, M. G., Dirican, A. C. & Ozturk, M. (2022). An Invisible Cause of Disability: Stigma in Migraine and Epilepsy. *Neurol Sci*. <https://doi.org/10.1007/s10072-022-05888-1>
- Labrague, L. J., Mcenroe-Petitte, D. M., Gloe, D., Thomas, L., Papathanasiou, I. V. & Tsaras, K. (2017). A Literature Review on Stress and Coping Strategies in Nursing Students. *J Ment Health*, 26, 471-480. doi: 10.1080/09638237.2016.1244721
- Lipton, R. B., Bigal, M. E. & Stewart, W. F. (2003). Assessing Disability Using the Migraine Disability Assessment Questionnaire. *Expert Review of Neurotherapeutics*, 3, 317-325.
- Lipton, R. B., Dodick, D., Sadovsky, R., Kolodner, K., Endicott, J., Hettiarachchi, J. & Harrison, W. (2003). A Self-Administered Screener for Migraine in Primary Care: The Id Migraine™ Validation Study. *Neurology*, 61, 375-382.
- Lipton, R. B., Liberman, J. N., Kolodner, K. B., Bigal, M. E., Dowson, A. & Stewart, W. F. (2003). Migraine Headache Disability and Health-Related Quality-of-Life: A Population-Based Case-Control Study from England. *Cephalgia*, 23, 441-450. doi: 10.1046/j.1468-2982.2003.00546.x
- Manti, P., Mastrogiannis, D., Mantzorou, M., Adamakidou, T., Mantoudi, A., Stefanidou, S. & Timmins, F. (2022). Stress Levels and Coping Strategies among Undergraduate Nursing Students in Greece During Economic Recession: A Cross-Sectional Study. *Nurse Education in Practice*, 60, 103299. 10.1016/j.nepr.2022.103299
- Menon, B. & Kinnera, N. (2013). Prevalence and Characteristics of Migraine in Medical Students and Its Impact on Their Daily Activities. *Annals of Indian Academy of Neurology*. 16, 221.
- Müller, B., Dresler, T., Gaul, C., Jürgens, T., Kropp, P., Rehfeld, A., Reis, O., Ruscheweyh, R., Straube, A. & Förderreuther, S. (2020). Use of Outpatient Medical Care by Headache Patients in Germany: A Population-Based Cross-Sectional Study. *Journal of Headache and Pain*, 21, 1-10. doi: 10.1186/s10194-020-01099-1
- Noor, T., Sajjad, A. & Asma, A. (2016). Frequency, Character and Predisposing Factor of Headache among Students of Medical College of Karachi. *Journal of Pakistan Medical Association*, 66, 159-164.
- Oikonomidi, T., Vikelis, M., Artemiadis, A., Chrousos, G. P. & Darviri, C. (2018). Reliability and Validity of the Greek Migraine Disability Assessment (Midas) Questionnaire. *PharmacoEconomics-Open*, 2, 77-85.
- Oraby, M. I., Soliman, R. H., Mahmoud, M. A., Elfar, E. & Abd Elmonem, N. A. (2021). Migraine Prevalence, Clinical Characteristics, and Health Care-Seeking Practice in a Sample of Medical Students in Egypt. *The Egyptian Journal of Neurology, Psychiatry and Neurosurgery*, 57, 1-9. <https://doi.org/10.1186/s41983-021-00282-8>

- Papadopoulou, A., Koureas, M., Farmakis, A., Sirakouli, A., Papanthanasidou, I. V. & Gourgoulidis, K. I. (2021). Increased Frequency of Health Anxiety in Health Science Students: A Cross Sectional Study in a Greek University. *Medical Archives*, 75, 221. doi: 10.5455/medarh.2021.75.221-228.
- Pappa, E., Kontodimopoulos, N. & Niakas, D. (2005). Validating and Norming of the Greek Sf-36 Health Survey. *Quality of Life Research*, 14, 1433-1438.
- Parikh, S. K., Kempner, J. & Young, W. B. (2021). Stigma and Migraine: Developing Effective Interventions. *Current Pain and Headache Reports* 25, 1-10. doi: 10.1007/s11916-021-00982-z
- Peres, M. F. P., Swerts, D. B., De Oliveira, A. B. & Silva-Neto, R. P. (2019). Migraine Patients' Journey until a Tertiary Headache Center: An Observational Study. *Journal of Headache and Pain*, 20, 1-8. <https://doi.org/10.1186/s10194-019-1039-3>
- Priode, K. S., Dail, R. B. & Swanson, M. (2020). Nonacademic Factors That Influence Nontraditional Nursing Student Retention. *Nursing Education Perspectives*, 41, 246-248. doi: 10.1097/01.NEP.0000000000000577
- Rababah, J. A., Al-Hammouri, M. M., Drew, B. L. & Aldalaykeh, M. (2019). Health Literacy: Exploring Disparities among College Students. *BMC Public Health*, 19, 1-11. DOI: 10.1186/s12889-019-7781-2
- Rai, N. K., Bitswa, R., Singh, R., Pakhre, A. P. & Parauha, D. S. (2019). Factors Associated with Delayed Diagnosis of Migraine: A Hospital-Based Cross-Sectional Study. *Journal of Family Medicine and Primary Care*, 8, 1925. doi: 10.4103/jfmpc.jfmpc\_376\_19
- Souliotis, K., Tsimtsiou, Z., Golna, C., Nikolaidi, S. & Lionis, C. (2019). Citizen Preferences for Primary Health Care Reform in Greece. *Hippokratia*, 23, 111.
- Steiner, T., Jensen, R., Katsarava, Z., Stovner, L., Uluduz, D., Adarmouch, L., Al Jumah, M., Al Khathaami, A., Ashina, M. & Braschinsky, M. (2021). Structured Q1 Headache Services as the Solution to the Ill-Health Burden of Headache: 1. Rationale and Description. *Journal of Headache and Pain*, 22. doi: 10.1186/s10194-021-01265-z.
- Stewart, W. F., Lipton, R. B., Celentano, D. D. & Reed, M. L. (1992). Prevalence of Migraine Headache in the United States: Relation to Age, Income, Race, and Other Sociodemographic Factors. *JAMA*, 267, 64-69.
- Stewart, W. F., Lipton, R. B., Dowson, A. J. & Sawyer, J. (2001). Development and Testing of the Migraine Disability Assessment (Midas) Questionnaire to Assess Headache-Related Disability. *Neurology*, 56, S20-S28.
- Tam, H. L., Mao, A., Cheong, P. L. & Van, I. K. (2020). "My Friends Are at the Bottom of My Schedule": A Qualitative Study on Social Health among Nursing Students During Clinical Placement. *International Journal of Environmental Research and Public Health*, 17, 6921. doi: 10.3390/ijerph17186921.
- Torres, G. C. S. & Paragas, J. E. D. Social Determinants Associated with the Quality of Life of Baccalaureate Nursing Students: A Cross-Sectional Study. Nursing Forum, 2019. Wiley Online Library, 137-143.
- Tountas, G., Filippidis, F., Gouveri, E., Dimitrakaki, X., Koutri, E. & Lostaracos, B. 2007. *Health of the Hellenic Population (Ygeia Tou Ellinikou Plithismou)*, Athens, Centre for Health Services Research, Department of Hygiene and Epidemiology, Medical School, University of Athens, Greece.
- Vlachou, E., Owens, D. A., Lavdaniti, M., Kalemikerakis, J., Evagelou, E., Margari, N., Fasoi, G., Evangelidou, E., Govina, O. & Tsartsalis, A. N. (2019). Prevalence, Wellbeing, and Symptoms of Dysmenorrhea among University Nursing Students in Greece. *Diseases*, 7, 5. doi: 10.3390/diseases7010005
- Wang, X., Sun, J., Xing, Y., Zhao, Y. & Zhu, Y. (2015). The Prevalence and Awareness of Migraine among University Students in Harbin, China. *Journal of Oral & Facial Pain and Headache*, 29.
- Wang, X., Zhou, H., Sun, J., Xing, Y., Zhu, Y. & Zhao, Y. (2016). The Prevalence of Migraine in University Students: A Systematic Review and Meta-Analysis. *European Journal of Neurology*, 23, 464-475.
- Ware, J. E. & Sherbourne, C. D. (1992). The Mos 36-Item Short-Form Health Survey (Sf-36). I. Conceptual Framework and Item Selection. *Medical Care*, 30, 473-483.
- Yeh, W. Z., Blizzard, L. & Taylor, B. V. (2018). What Is the Actual Prevalence of Migraine? *Brain and Behavior*, 8, e00950. <https://doi.org/10.1002/brb3.950>