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RESEARCH ARTICLE

KNOWLEDGE AND ATTITUDES OF NURSES REGARDING PAIN IN ADULTS' INTENSIVE CARE UNITS

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Abstract

Background: Pain is a significant aggravating factor in the adult Intensive Care Unit (ICU). Bibliographically it is usually mentioned as the fifth vital point. Pain in ICUs is difficult to assess due to the health status of the patients admitted to it.

Material and Method: In the present survey a total sample of 63 nursing staff was received by the method of interview. To collect data, an anonymous questionnaire that captures the basic demographics and the questionnaire "Knowledge and Attitudes Survey Regarding Pain" of Ferrell and McCaffery were used. Also, a consent form for participation in the research was distributed as well.

Results: The knowledge score ranged from 27.6 to 82.8 points with a mean of 50.2 points. It appeared to be a statistically significant finding between knowledge of nursing staff and their marital status ($p = 0.043$) and basic nursing education ($p = 0.010$). Singles and those with a university degree turned out to have higher knowledge scores.

Conclusion: Lack of knowledge of the nursing staff regarding pharmacology was found. Data gathered in the present study may be useful for the reorientation of
educational programs at undergraduate level and to provide feedback for lifelong programs of employed nurses.

Key words: Knowledge and attitude regarding pain, Intensive care unit, pain, nurses.

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INTRODUCTION

The term "pain" originates from the Latin word "Poena" i.e. "penalty" in ancient Greek. Since the ancient times, pain was a significant burden for the patient and caused many problems in regard to its management. In literature, pain is referred as the 5th vital sign which must be monitored and recorded.[1,2] According to the International Association for the Study of Pain (IASP), pain is defined as " An unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage."[3]

Pain as an emotional experience has intense elements of subjectivity and therefore it is approached through pain assessment scales.[4,5,6] Also consists a sign of the organism about an existing or an imminent damage. There are two pain categories, acute and chronic pain.[7] Specifically, in the case of ICU pain is classified in four categories: 1. chronic pain that appears before patient's admission to the ICU; 2. Acute pain that is related with a specific disease; 3. Persistent pain that is associated with clinical interventions /discomfort; 4. intermittent pain that relates with procedures i.e. patients under vigilance or sedation.1

As IASP states, "The inability to communicate verbally does not negate that a patient is experiencing pain and is in need of proper analgesic treatment." [9] The nursing professionals have a significant role to the pain assessment and management and the use of a document or any other record is recommended.[10] The foremost challenges faced by nursing professionals in using pain assessment scale in patients unable to communicate are, the "forgotten priority", "organizational barriers", "attitudinal barriers", and "barriers to knowledge".[11]

Albeit the important role of nurses in the ICUs and while it is proved that their attitude and knowledge in pain management contributes in its practical management,[7,12] there are sufficient international researches concluding that there is lack of knowledge and ineffective treatment. [1,13,14] Finally, the level of nursing education, hospital's policy, age, ethnicity and work experience showed a strong impact on nurses' attitudes on pain management.[1,7,15,16,17]

AIM

The targets of the research were the investigation of knowledge and attitudes of nurses in respect to ICU patients' pain and the correlation with demographic factors like education and years of work experience in the nursing profession.

MATERIAL AND METHODS

Sample

In the present study 63 nurses who are employed in the ICU of a general hospital of Athens participated. In order to be included in the sample, the nurses should satisfy the criterion of having graduated from tertiary education meaning those with a bachelor's degree. Nursing assistants were not included.

Ethics

In the present study, all the principles of ethics and deontology that regulate research conduct, were applied. Regarding the principles of deontology, in our country (Greece) stands the Hippocratic principle that determines the absolute respect to human life. In order to conduct research, the deontology committees are based to "Medical Deontology", "Nursing Deontology", the Penal Code (L. 1492/1950), the Nuremberg Code -1947, the "Declaration of Geneva"-1975 and finally the "Helsinki declaration"-1989. The protocol number of approval from the hospital's scientific committee where the research took place is 39/10-2-2023.

Data collection

In the present study were used:

A) Document for demographic data recording, like age, gender, and educational level as well as the special education in pain management

B) The questionnaire "Knowledge and attitude survey regarding pain" of Ferrell and McCaffery, in English language, that consisted of (i) correct-wrong sentences, (ii) multiple choice questions and (iii) case studies were participants are asked to take a decision regarding pain and pharmaceutical treatment. Each case study was followed by 2 sub questions of multiple choice.2 The questionnaire's coefficient of internal consistency Cronbach's alpha was 0.70. This fact shows a satisfactory internal consistency. Moreover, necessary explanations were provided to all research participants upon presentation of the questionnaire.

C) Document of consent of participation in the research.

The research was conducted during February-June 2023 using

the interview method.

Data analysis

For the statistical analysis the Kolmogorov-Smirnov criterion was used to test the distributions of quantitative variables regarding the normality of their distribution. For those that were normally distributed the mean values and standard deviations (SD) were used for their description. For the variables that were not normally distributed, median and interquartile ranges were additionally calculated. Absolute (N) and relative (%) frequencies were used for the description of qualitative variables. In order to test the relation between two quantitative variables, the Spearman correlation coefficient was used. In order to compare quantitative variables between two groups, the parametric test of Student's-test was used. Linear regression analysis was used in order to find independent factors that relate to participants' knowledge in general and separately in each part of the questionnaire. From this dependence coefficients (β) were extracted and their standard errors (SE). When the distribution of the dependent variable was not normal, it was used as logarithm. The levels of significance were pairwise and statistical significance was set at 0.05. The statistical program SPSS 26.0 was used for the analysis.

RESULTS

Sample description, Participants' professional data, Chronic or acute pain in personal level

The sample of the study consists of 63 ICU nurses (N=63) of a General Hospital in the Attica Region. 12 were males (n=12, and 19%) and 51 were females (n=51 and 81%), with average age 33.1 years (SD=6.7 years). The demographic and other data are presented in Table 1.

Pain evaluation with the scale "Knowledge and Attitudes Survey Regarding Pain"

Table 2 shows the questions and answers in the binary questions "true-false" in the scale «Knowledge and Attitudes Survey Regarding Pain».

Table 3 shows the answers to the multiple-choice questions of the scale "Knowledge and Attitudes Survey Regarding Pain".

Table 4 shows the answers to scenarios. The scenarios were about pain evaluation form 0-10. The right answers to all parts of the questionnaire are shown with green color.

Knowledge results calculation

Afterwards, based on the above questions, a knowledge results calculation was employed in a percentage rate. Calculations were made giving in each right answer the value 1 and in each wrong answer the value 0.

Higher score was related to more knowledge.

To this particular sample, the score ranged from 27.6 to 82.8 units with a mean value of 50.2 units (SD=12.8 units).

Correlation of knowledge results with demographic characteristics

In the analysis, no significant statistical difference was found of knowledge results regarding the gender (p=0.407) and the postgraduate nursing education (p=0.288). It is observed that there is a statistically significant difference of knowledge regarding relationship status (married, p=0.043) and the distinction of tertiary's education diploma (p=0.010). (Table 5).

Correlation of knowledge results with age and work experience

In the analysis, no statistical significance was found of knowledge results regarding the age (p=0.520) and the years of work experience (p=0.551).

Correlation of knowledge results with participants' professional data

In the analysis, no statistical significance was found of knowledge results regarding any factor from professional data as p values were (p= 0.412, 0.456, 0.894, 0.779, 0.535).

Multifactorial Linear Regression

In order to find the factors that are independently related to knowledge score, a multiple linear regression was employed. The depended variable was participants' grade in knowledge scale and the independent variables were demographic data, employment data and acute or chronic pain treatment.

Educational level and marital status were found to be related independently with knowledge score. Specifically, participants with a TEI diploma had a lower knowledge score compared to those with a university degree which had a higher knowledge score.

Those who were married had lower knowledge scores compared to non-married participants who had a higher knowledge score.

Participants' basic education had the higher influence on the score. (Table 6).

Afterward, the knowledge grade was checked separately for each part of the questionnaire. The score for the part of true-false questions ranged from 13.3 to 93.3 units with a mean value of 51.6 units (SD=16.6 units).

The score for the part of multiple-choice questions ranged from 20.0 to 90.0 units with a mean value of 57.1 units (SD=17.8 units).

The score for the part that related to the studies' questions ranged from 0.0 to 100.0 units with a mean value of 27.4 units (SD=26.8 units).

Multifactorial Linear Regressions

In order to find the factors that are independently related to participants' knowledge score, multiple linear regressions were employed in each part of the questionnaire i.e. (i) true-false questions, (ii) multiple choice questions and (iii) related to the studies questions. The dependent variable was participants' grade in knowledge scale in each part and the independent variables were demographic data, employment data and acute or chronic pain treatment.

Having as dependent variable the score of correct-wrong questions, the correlation employment between knowledge score and demographic data, employment data and acute or chronic pain treatment, derived a statistically significant finding for relationship status (P=0.044). Specifically, those who were married recorded a lower score and thus had less knowledge compared to the unmarried ones.

Having as dependent variable the score of multiple questions, the correlation employment between knowledge score and demographic data, employment data and acute or chronic pain treatment, derived a statistically significant finding for family status (P=0.044) and undergraduate education (P=0.050). Specifically, those who had a TEI diploma had a lower score, and thus, less knowledge, compared to those who hold a university degree. Moreover, those who were married recorded a lower score, and thus, had less knowledge, compared to the unmarried ones.

Finally, having as dependent variable the score related to the scenario's questions, the correlation employment between knowledge score and demographic data, employment data and acute or chronic pain treatment, no statistically significant finding was derived (P>0.05). So, none of the above factors was independently related to the knowledge score regarding the studies' 4 questions.

DISCUSSION

In the present study, the knowledge of ICU nurses about patients' pain was investigated, with the use of the scale "Knowledge and Attitudes Survey Regarding Pain". The questionnaire of the sample's characteristics was also filled. The answers of 63 nurses were studied, regarding the basic and postgraduate education, age, years of work experience, marital status, personal pain experience and their views about it, and finally their opinion on work conditions.

Commenting on the results, it is important to mention that the great majority of the participants would change their workplace if there was an opportunity and more than half of them would change profession. This fact may be attributed to the burn out nurses endure, given that more than 50% personally experience a problem of acute or chronic pain and face difficulties in changing departments, from ICU to another of a lesser adversity, due to the particularities of the unit.

Moreover, from the study's results it is extrapolated that nurses' knowledge about ICU patients' pain was moderate given that almost half of them gave the right answers. Specifically, the mean value of the sample's knowledge score was 50.2 units. The analysis of the study showed a correlation between knowledge results and undergraduate education as long as relationship status. Specifically, those who graduated from TEI had less knowledge compared to those who graduated from university institutions. Additionally, the married nurses had less knowledge compared to their unmarried peers. A possible explanation regarding the title of academic qualification, are the differences in the undergraduate programs and the date of acquirement of the TEIs' degree (6 years back) and the low nurses' participation to continuous educational programs because of work pressure. Regarding family status, a possible evaluation of the findings is the lack of time due to increased responsibilities of married compared to unmarried nurses. Moreover, academic titles like postgraduate degrees, didn't differentiate the results on knowledge

rate. A possible explanation is the fact that nurses may hold postgraduate degrees of various programs that are not related to the workplace. So, the nurse professionals need lifelong seminars oriented to new knowledge and technology according to the department they work in.

Similar results were shown by studies from abroad and Greece as well.[1,7,13,16,17,37,38,39] A respective research in Greece to nurses that delivered care to non ICU patients the percentage of knowledge score reached 55.6%.[7] In the international level, a percentage lower than 50% was traced to nurses employed to ICUs, Emergency departments, operating rooms, education and management, and oncological patients in Rwanda[1], Palestine[13], Jordan (48.2%)[38], Saudi Arabia (42.5%)[37], China (40.3%)[16], Turkey (39.65%)[17] and Taiwan (50.5%)[39]. Opposite results that show a knowledge score above 50% regarding pain treatment in patients of Emergency departments, ICUs, surgical and gynecological departments, were conducted in Iceland (68.8%) and USA (76%).[40,41]

The undergraduate education and the level of education in general appeared to affect knowledge and attitudes of nurses in Rwanda, Palestine, Turkey and Iceland.[1,13,14,17,41] Statistical significant factor appeared to be the workplace i.e. the department the nurses were employed, in Rwanda, Turkey, and China in contrast to the Greek studies.[1,16,17] Finally, to certain countries like Saudi Arabia and China, ethnicity appeared to have an effect.[16,37]

In the present research, like in other international studies, evidence showed that years of work experience and age do not affect the knowledge and attitudes of nurses towards pain.[1,13,14,16,17,37,38,39,40] An interesting research conducted in Taiwan emphasized that ICU nurses had a lower score of right answers compared to nurses that cared oncological patients or were occupied in Emergency departments.[39]

Regarding the true-false and multiple-choice questions of the present study, there are fewer right answers, and thus, less knowledge on pharmacology (for example, doses, drugs combinations, duration of therapeutic effect) mostly to oncological patients. A possible explanation is that the number of oncological patients in ICUs is small. Moreover, it appears that only 25.4% of nurses know that vital signs are not always reliable indicators of patient's pain intensity. This may be due to the fact that ICU patients are not able to communicate, mostly verbally, and are always attached to a monitor that shows their vital signs. Therefore, most nurses refer to vital signs as pain level evidence. More right answers to the question "vital signs are always reliable indicators of patient's pain intensity" were found in Palestine (45.5%), Jordan (54.9%) and Rwanda (62.3%).[1,13,14] Less than half nurses gave right answers to the question "patients can sleep despite their intense pain" in Palestine and Jordan, while in Greece the percentage reached 50%.[13,14]

Finally, in the scenarios, it was pictured how subjective pain assessment is (usually is underestimated) and that the majority is based on the patient's clinical appearance and not on how much pain he/she is experiencing. Additionally, it was pointed out that nurses hesitate before morphine administration and prefer to administer lower doses of it. Similar results were found by international studies were ICU nurses had concerns about opioids' side effects and lack of knowledge regarding pharmacology.[1,14] Similar to the Greek studies' findings on scenarios, were demonstrated by a research on ICU nurses in Palestine, which shows that they pay attention to a patient's clinical picture, if he/she speaks, if he/she smiles, if he/she is silent. [13]Moreover, in the present study, from the first scenario, it is obvious that there is a great underestimation of pain, and the administered dose of morphine is lower than the recommended one. In the second scenario, these percentages increase even so that they remain below 50% (<50%). The same finding was reported in research conducted in Saudi Arabia and Jordan.[37,38] In contrast, a research in Island showed that the corresponding percentages to the scenarios are 48.9% and 82.1%, but patients' clinical picture is highly valued given that in the second scenario the percentage is much higher.[41]

CONCLUSIONS

The international and the Greek studies highlighted the lack of knowledge from nurses employed in ICUs regarding pain. More specifically, the mean value of the sample's knowledge score was 50.2 units, close to the scores of Jordan, Saudi Arabia and Taiwan. These low scores may be due to the undergraduate education or the family status. Years of work experience and age

do not affect the knowledge and attitudes of nurses towards pain. To sum up, adequate knowledge of nurses regarding pain assessment improves patients' and patients' family's quality of life, as facilitates the task of the therapeutic team and contributes to pain treatment effectively.

CONCLUSIONS

From all the above it is clear that there is lack of knowledge of the nursing staff, especially regarding pharmacology, in both international and Greek studies. This may highlight the need for pain management continuous education within hospitals. For this reason, it is proposed the enforcement of education at the undergraduate level, programs of continuing education according to the needs of integration departments, more emphasis in understanding and pain assessment, design and implementation of protocols in order to increase nurses' knowledge and improve their attitudes on pain, succeeding a better patients' satisfaction.

LIMITATIONS

Due to the circumstances of ICU department understaffing and the recent covid 19 outbreak, it wasn't possible to collect more questionnaires. Therefore, the study's findings reflect the knowledge that stems from a specific hospital of Attica District and the above restrictions must be taken into consideration in case of generalizing results.

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ANNEX

TABLE 1. Demographic, Participants workplace and Pain management in the personal level data

		N	%
Gender	Male	12	19.0
	Female	51	81.0
Age, Average (SD), Mean (range)		33.1 (6.7)	32.0 (29 -34)
Marital status	Unmarried	44	69.8
	Married	18	28,6
	Widow	1	1.6
Basic nursing education level	Higher Education Institutions diploma (AEI)	9	14.3
	Technical Educational Institution diploma (TEI)	54	85.7
Post graduate nursing education	No	44	69.8
	Yes	19	30.2
Professional nursing work experience, Average (SD), Mean (range)		7.7 (6.4)	6.0 (4 – 8)
Employment relationship with the hospital	Constantly contracted	18	28.6
	Fixed term contract	45	71.4
Work department	Resuscitation for heart surgery patients	9	14.3
	ICU	45	71.4
	Heart attach unit	9	14.3
Job position	Nurse	59	93.7
	Head department	4	6.3
Did you attend seminars/conferences, training programs, about pain management during the previous year?	No	61	96.8
	Yes	2	3.2
If you had the opportunity, would you change your workplace?	No	10	15.9
	Yes	53	84.1
If you had the opportunity, would you change profession?	No	20	31.7
	Yes	43	68.3
Do you personally experience acute or chronic pain problems?	No	31	49.2
	Yes	32	50.8
In case you face a personal pain problem or a person in your close family environment does, then please describe how much this has an impact on you and how much has changed your view upon the subject of pain.	To some degree	6	18.8
	My view for pain has not changed.	3	9.4
	I pay more attention.	1	3.1
	Very much regarding the patient's mental clarity, patience and health outcomes. You put yourself in the place of the patient.	1	3.1
	More empathy	1	3.1

TABLE 2. Answers in the binary questions "true-false" in the scale «Knowledge and Attitudes Survey Regarding Pain»

		N	%
Vital signs are always reliable indicators of the intensity of patient's pain.	False	16	25.4
	True	47	74.6
Because their nervous system is underdeveloped, children under 2 years of age have decreased pain sensitivity and limited memory of painful experiences.	False	33	52.4
	True	30	47.6
Patients who can be distracted from pain, usually do not have severe pain.	False	34	54.0
	True	29	46.0
Patients may sleep in spite of severe pain.	False	31	49.2
	True	32	50.8
Aspirin or other non-steroidal anti-inflammatory agents are NOT effective analgesics for painful bone metastases.	False	22	34.9
	True	41	65.1
Respiratory depression rarely occurs in patients who have been receiving stable doses of opioids over a period of months.	False	27	42,9
	True	36	57.1
Combining analgesics that work by different mechanisms may result in better pain control with fewer side effects than a single analgesic agent.	False	36	57.1
	True	27	42.9
The usual analgesic duration of 1-2 mg morphine IV is 4-5 hours.	False	20	31.7
	True	43	68.3
Opioids should not be used in patients with a history of substances abuse.	False	29	46.0
	True	34	54.0
Elderly patients cannot tolerate opioids for pain relief.	False	46	73.0
	True	17	27.0
Patients should be encouraged to tolerate as much pain as possible before using an opioid.	False	37	58.7
	True	26	41.3
Children less than 11 years old cannot reliably report pain so clinicians should rely on the parent's assessment of the child's pain intensity.	False	51	81.0
	True	12	19.0
Patients' spiritual beliefs may lead them to think pain and suffering are necessary.	False	18	28.6
	True	45	71.4
After the initial dose of opioid analgesic is given, subsequent in accordance with the individual patient's response.	False	29	46.0
	True	34	54.0
Giving patients sterile water by injection (placebo) is a useful test to determine if the pain is real.	False	26	41.3
	True	37	58.7

TABLE 3. Answers to the multiple-choice questions of the scale "Knowledge and Attitudes Survey Regarding Pain"

		N	%
The recommended route of administration of opioids analgesics for patients with persistent cancer- related pain is:	intravenous	38	60.3
	Intramuscularly	4	6.3
	Subcutaneously	4	6.3
	Oral	15	23.8
	Rectal	2	3.2
The recommended route to administer opioid analgesics for patients with brief, severe pain, of sudden onset, such as trauma or postoperative pain is:	intravenous	52	82.5
	Intramuscular	9	14.3
	Oral	2	3.2
Which of the following analgesic medications is considered the drug of choice for the treatment of prolonged moderate to severe pain for cancer patients?	Morphine	1	1.6
	Meperidine	54	85.7
	Tramadol	8	12.7
A 30 mg dose of oral morphine is approximately equivalent to:	Morphine 5 mg IV	25	39.7
	Morphine 10 mg IV	26	41.3
	Morphine 30 mg IV	11	17.5
	Morphine 60 mg IV	1	1.6
Analgesics for post-operative pain should initially be given	Around the clock on a fixed schedule	58	92.1
	Only when the patient asks for the medication	4	6.3
	Only when the nurse determines that the patient has moderate or greater discomfort	1	1.6
A patient with persistent cancer pain has been receiving daily opioid analgesics for 2 months. Yesterday, the patient received 200 mg of morphine/hour intravenously. Today he has been receiving 250 mg/hour intravenously. The likehood of patient developing clinically significant respiratory depression in the absence of new comorbidity is	<1%	25	39.7
	1-10%	20	31.7
	11-20%	12	19.0
	21-40%	4	6.3
	>41%	2	3.2
The most likely reason a patient with pain requests increased doses of pain medication is:	The patient is experiencing increased pain	53	84.1
	The patient is experiencing increased anxiety or depression	2	3.2
	The patient's requests are related to addiction	8	12.7
Which of the following is useful for treatment of cancer pain?	Ibuprofen (Motrin)	0	0.0
	Hydromorphone (Dilaudid)	26	41.3
	Gabapentin (Neurontin)	1	1.6
	All the above	36	57.1
The most accurate judge of the intensity of the patient's pain is	The treating physician	18	28.6
	The patient's primary nurse	8	12.7
	The patient	37	58.7
Which of the following describes the best approach of cultural considerations for patients in pain	There are no cultural influences due to population's diversity	3	4.8
	Cultural influences can be determined by an individual's ethnicity	3	4.8
	Patients should be individually assessed to determine cultural influences.	57	90.5

TABLE 4. Answers related to scenarios

		N	%
On the patient's record you must mark his pain on the scale below. Circle the number that represents your assessment of Andrew's pain.	1	3	4.8
	2	8	12.7
	3	12	19.0
	4	17	27.0
	5	11	17.5
	6	8	12.7
	8	4	6.3
Choice of action	Administer no morphine at this time	32	50.8
	Administer morphine 1 mg IV now	20	31.7
	Administer morphine 2 mg IV now	6	9.5
	Administer morphine 3 mg IV now	5	7.9
On the patient's record you must mark his pain on the scale below. Circle the number that represents your assessment of Robert's pain.	2	1	1.6
	4	1	1.6
	5	8	12.7
	6	9	14.3
	7	9	14.3
	8	35	55.6
Choice of action	Administer no morphine at this time	4	6.3
	Administer morphine 1 mg IV now	19	3.2
	Administer morphine 2 mg IV now	15	23.8
	Administer morphine 3 mg IV now	25	39.7

TABLE 5. Knowledge score according to participants' demographic characteristics

		Knowledge score Mean value (SD)	P
Gender	Male	47.4 (12.9)	0.407+
	Female	50.8 (12.8)	
Married	No	52 (12.9)	**0.043+**
	Yes	45.8 (11.6)	
Basic nursing education	University diploma	60.2 (14.3)	**0.010+**
	Diploma TEI	48.5 (11.8)	
Postgraduate nursing education	No	49.1 (11.1)	0.288+
	Yes	52.8 (16)	

TABLE 6. Correlation of knowledge score with independent variables the participants' demographic characteristics, employment data and acute or chronic pain treatment

	β+	**SE++**	**b***	**P**
Gender (Female vs Male)	2.968	4.872	0.092	0.545
Age	0.087	0.917	0.045	0.925
Married (Yes vs No)	-7.951	3.838	-0.283	**0.043**
Basic nursing education (TEI diploma vs University degree)	-11.050	5.072	-0.305	**0.034**
Postgraduate nursing education (Yes vs No)	0.335	3.719	0.012	0.929
Work experience in nursing profession	-0.397	0.895	-0.198	0.659
Employment relationship with the hospital (Fixed term contract vs Constantly contracted)	-5.076	2.594	-0.362	0.056
Occupied in ICU (Yes vs No)	-1.760	3.604	-0.063	0.627
If you had the opportunity, would you change your workplace? (Yes vs No)	0.229	5.612	0.007	0.968
If you had the opportunity, would you change profession? (Yes vs No)	-0.525	3.787	-0.019	0.890
Do you face personal problems of acute or chronic pain? (Yes vs No)	1.090	3.443	0.043	0.753