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Assessing levels of knowledge on the principles of pain management during post-graduate education of physicians in Poland

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Abstract

Treating chronic pain forms an integral part of patient care where a doctor's level of expertise is important for ensuring an adequately pain-free life. The aim of the study, therefore, was to assess the level of knowledge in pain management among doctors during their post-graduate education; some of whom were already qualified in various branches of medical specialisation.

Materials and Methods: A survey was performed on doctors undergoing post-graduate training unrelated to the treatment of pain at the Post-Graduate Education Centre at the Institute of Rural Health in Lublin, Poland. The questionnaire comprised of demographic and factual sections, the latter consisting of nine multiple choice questions on symptomatology and pharmacology of pain, including opioid treatment and neuropathic pain.

Results: From the 271 respondents, 203 (74.9%) filled in the questionnaire properly, of whom 131 (64.5%) were female. The mean age was 35.5 years (SD=6.3). The average number of correct replies received were 5.75 or 63.9%, (SD=0.51); of the total of 9 questions set, correct answers were seen most frequently for questions No. 2 and question No. 4 (83.7 and 78.3%, respectively). Only 7 fully correct sets of answers were recorded.

Conclusions: Significant shortcomings in knowledge about pain management were therefore observed from the sample of doctors' taken in the presented study. It is suggested that alternative/modified methods of education are required to address this issue, especially for doctors who do not have to deal with pain on a daily basis.

Key words

chronic pain, knowledge of pain management, opioid treatment, neuropathic pain, medical education, post-graduate education

INTRODUCTION

Irrespective of the causes, the treatment of pain forms an integral part of medical care [1, 2]. It is also recognised that the emergence of both new academic/scientific societies and specialist medical centres dealing in pain management, together with the use of novel pain killers, should now enable pain therapy to become more effective. However, despite the advancement of knowledge and the new developments seen in pharmacological and invasive treatments/techniques, significant numbers of patients still complain of medium to intense pain [3, 4]. It is therefore likely that insufficient knowledge on the part of doctors is a contributing factor for ineffective pain diagnosis and management. This is supported by many international studies from Israel [5], France [6, 7], Sweden [8], Iran [9], USA [10], Canada [11], Italy [12], Germany [13], Norway [14] and Poland [15], where in some cases a knowledge gap on the underlying principles has also been demonstrated [16].

The principles of pain management are given in the WHO analgesic ladder for prescribing analgesics [17], and are based on extensive guidelines published by the medical scientific community [18]. Nevertheless, many studies have shown that accepted procedures in chronic pain management are not sufficiently well known, [8, 9, 10, 11, 13, 15, 18, 19, 20, 21, 22, 23]. Indeed, a recent long-term Finnish study suggests that a systematic education of doctors in this field can make a significant impact on the levels of acquired expertise on pain [24].

In this respect, the doctor at the point of first contact should be appropriately trained in treating pain, especially in a rapid manner whenever it is intense [25], thereby ensuring adequate levels of patient care. An immediate and appropriate response may often also prevent acute pain from becoming chronic, which not only improves patient comfort and quality of life, but provides savings in valuable health care resources that would otherwise be unnecessarily spent. The doctor's knowledge on how to treat pain is therefore a key issue which forms the main aim of the presented study in order that any significant deficiencies that may exist can be identified as targets for remedial action.

MATERIALS AND METHODS

Details on the doctors' qualifications were obtained during their post-graduate training at the Lublin Institute of Rural Health which was unrelated to pain management. The survey consisted of a questionnaire prepared by the authors, divided into a demographic and a factual section. The former included

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age, gender, place of employment (whether in public or private health care), medical specialisation (if any), and willingness for possible collaboration with hospital clinics providing palliative care or pain management. Respondents were also asked whether patients receive oncological treatment in their practice and whether they had participated in any previous pain management training courses. They were additionally asked to self-score their level of knowledge of pain management and to state if they thought there was any perceived need for training in this area.

The second part of the survey consisted of 9 multiple choice questions on pain symptoms and pharmaco-therapy, with one correct answer. The questions and options are detailed in Appendix 1, where the number of respondents selecting each option/question are also shown. The mean of all correct answers was calculated ± the standard deviation. In order to facilitate statistical analyses the following categories were adopted – 3 scoring groups of numbers of correct answers were defined: group A (8-9), group B (6-7) and group C (0-5). Questions 1, 3, 4, 5, 7 and 9 were on opioid treatment and designated ‹OP›, whereas questions 2, 6 and 9 concerned neuropathic pain and designated as ‹NEUR›. The numbers of correct answers received for each OP and NEUR group were rated >60% as ‹A›, 30-60% as ‹B› and <30% as ‹C›.

Statistical analyses were performed using the $\chi 2$ test, and a t-test was used to compare mean values in uncoupled groups whenever the effect of a given factor on the final results needed to be evaluated. Statistical significance was taken as $p<0.05$.

Table 1. Numbers of participant physicians grouped according to particular factors to determine their influence on their knowledge of pain treatment.

Factors influencing pain treatment knowledge	Yes n (%)	No n (%)
Specialisation	45 (22.2)	158 (77.8)
Employment in national health service	126 (62.1)	77 (37.9)
Cancer patients treatment	137 (67.5)	66 (32.5)
Collaboration with Pain Centres	83 (40.9)	120 (59.1)
Collaboration with Palliative Care Centres	108 (53.2)	95 (46.8)
Training courses organised by:	103 (50.7)	100 (49.3)
Institutions	62 (30.5)	141 (69.5)
Pharmaceutical Companies	44 (21.7)	159 (78.3)

RESULTS

A total of 271 doctors were surveyed from the intake of those undergoing specialist training in the 5 chosen medical fields. Completed questionnaires were obtained from 203 doctors (74.9%) which was therefore used for the study analyses. The mean age of the study group was 35.5 years (±6.3SD) and females constituted 64.5% (n=131). The length of time worked professionally was classified into the 3 following categories: 1) <5 years, n=85 (41.9%); 2) 5-10 years, n=77(37.9%); 3) >10 years, n=41(20.2%). It was found that the majority of respondents did have a specialisation (n=158, 77.8%), they worked in the public health sector, (n=126, 62.1%) and treated patients for cancer, (n=137, 67.5%). Less than half (n=83, 40.9%), were involved in pain treatment clinics, whereas more were engaged in palliative care outpatient clinics (n=108, 53%). About half (50.7%), had previously undergone training courses in treating pain of which 30.5% was provided by institutional training for doctors and 21.7% by pharmaceutical companies (Tab. 1).

The factual part of the questionnaire received an average number of correct replies of 5.75 or 63.9%, (SD=0.51) of all 9 questions set, and the most correct answers were seen for question No. 2 and question No. 4 (83.7 and 78.3%, respectively). In contrast, question No. 5 received the fewest correct answers (37.9%) (Appendix and Figs. 1, 2).

Using the appropriate $\chi 2$ and t-tests the factors influencing the surveyed knowledge base were found to be the degree of work undertaken in palliative care, professional training and self-assessment of knowledge. Training courses undertaken in the treatment of pain were also found to be equally significant, with the exception of neuropathic pain for which less knowledge was evident. Although experience in cancer treatment and co-work in pain clinics affected the total knowledge scores, knowledge about opioids and neuropathic pain was unchanged. Expertise acquired from institutional training had no influence on the current analysis; however, that provided by the pharmaceutical industry increased levels of general knowledge and on opioid treatment, but not on neuropathic pain. This was also confirmed by analyses of mean values. Self-assessment on symptoms and pain management were found to be very reliable and those doctors who rated their knowledge as high achieved higher scores in all questions. The demand for more training in pain treatment was seen to be somewhat paradoxically higher in those doctors with the higher scores.

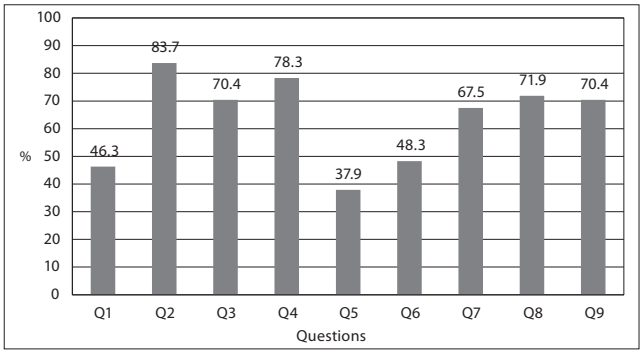

Figure 1. Percentage of correct answers to individual questions

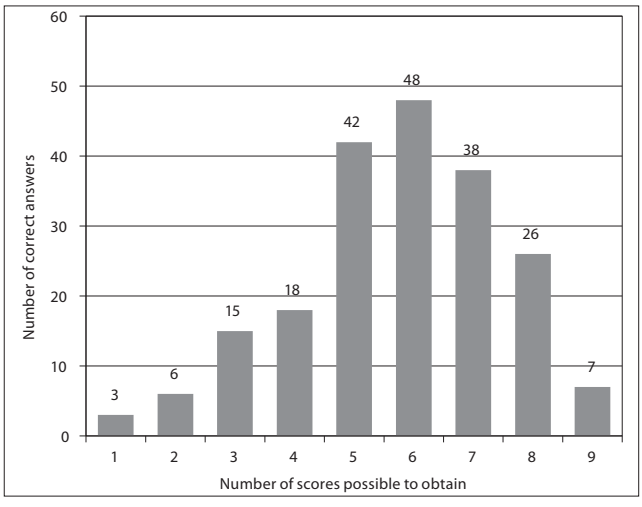

Figure 2. Distribution of the number of correct replies

There were no significant differences in the level of knowledge between specialists and those undergoing specialisation, nor between places of doctor's employment and time worked professionally (Tabs. 2, 3; Fig. 3).

Table 2. Effect of factors influencing pain treatment knowledge on the total number of correct replies (Total No.), and number of correct replies on treatment with opioids or neuropathic pain

Factors influencing knowledge		Total No.	Opioids	Neuropathic pain
Specialisation				
	χ^2	1.08	0.92	1.96
	DF (*p*)	2 (0.5814)	2 (0.6324)	2 (0.3751)
Employment in national health service				
	χ^2	2.27	3.82	2.81
	DF (*p*)	2 (0.3208)	2 (0.1477)	2 (0.2450)
Cancer patients treatment				
	χ^2	9.08	1.99	2,54
	DF (*p*)	2 (0.0107)	2 (0.3689)	2 (0.2810)
Collaboration with Pain Centres				
	χ^2	6.70	5.16	4.06
	DF (*p*)	2 (0.0351)	2 (0.0758)	2 (0.1313)
Collaboration with Palliative Care Centres				
	χ^2	14.30	9.92	11.69
	DF (*p*)	2 (0.0008)	2 (0.0070)	2 (0.0029)
Training courses				
	χ^2	7.82	11.77	6.04
	DF (*p*)	2 (0.0200)	2 (0.0028)	2 (0.0487)
organised by institutions				
	χ^2	3.47	1.69	2,95
	DF (*p*)	2 (0.1768)	2 (0.4293)	2 (0.2292)
organised by pharmaceutical comp.				
	χ^2	20.54	29.07	2.87
	DF (*p*)	2 (0.0000)	2 (0.0000)	2 (0.2378)
Years employed				
	χ^2	0.99	8.30	2.11
	DF (*p*)	4 (0.9110)	4 (0.0813)	4 (0.7156)
Self-reported knowledge				
	χ^2	17.64	15.83	14.12
	DF (*p*)	2 (0.0001)	2 (0.0004)	4 (0,0069)
Need for training courses				
	χ^2	7.89	2.37	8.01
	DF (*p*)	2 (0.0193)	2 (0.3053)	2 (0.0185)

χ^2 test, χ^2 – chi-square value, DF – degrees of freedom, *p* – significance level

Table 3. Effect of factors influencing pain treatment knowledge on the total number of correct replies (Total No.), and number of correct replies on treatment with opioids or neuropathic pain

Factors influencing knowledge	Total No.	Opioids	Neuropathic pain
Cancer patients (*p*)	0.0226	0.061	0.076
No	5.34 SD 1.78	3.47 SD 1.19	1.88 SD 0.97
Yes	5.94 SD 1.69	3.82 SD 1.29	2.11 SD 0.85
Training courses (*p*)	0.0012	0.0078	0.012
No	5.35 SD 1.68	3.47 SD 1.18	1.88 SD 0.87
Yes	6.14 SD 1.72	3.94 SD 1.31	2.19 SD 0.83
organised by institutions (*p*)	0.1472	0.4715	0.0721
No	5.63 SD 1.86	3.66 SD 1.33	1.96 SD 0.91
Yes	6.02 SD 1.4	3.8 SD 1.11	2.21 SD 0.83
organised by pharmaceutical comp. (*p*)	<0.00001	<0.00001	0.077
No	5.45 SD 1.61	3.47 SD 1.46	1.98 SD 0.91
Yes	6.81 SD 1.78	4.57 SD 1.34	2.25 SD 0.78
Collaboration with Pain Centres (*p*)	0.0272	0.1406	0.02810
No	5.53 SD 1.79	3.6 SD 1.28	1.93 SD 0.95
Yes	6.07 SD 1.61	3.87 SD 1.25	2.21 SD 0.79
Collaboration with Palliative Care Centres (*p*)	0.00015	0.0066	0.00056
No	5.26 SD 1.85	3.45 SD 1.30	1.81 SD 0.96
Yes	6.18 SD 1.52	3.94 SD 1.20	2.24 SD 0.78
Evaluation of knowledge (*p*)	0.000003	0.00001	0.042
Low	5.45 SD 1.6	3.5 SD 1.22	1.94 SD 0.88
High	6.78 SD 1.67	4.4 SD 1.2	2.37 SD 0.85
Need for training courses (*p*)	0.02	0.0240317	0.0045
Low	5.46 SD 1.89	3.60 SD 1.88	1.86 SD 0.91
High	6.03 SD 1.53	3.81 SD 1.15	2.22 SD 0.84

Significance of differences between results obtained by groups of respondents – tStudent test. Data are presented as mean values, SD – standard deviations and *p* – significance level

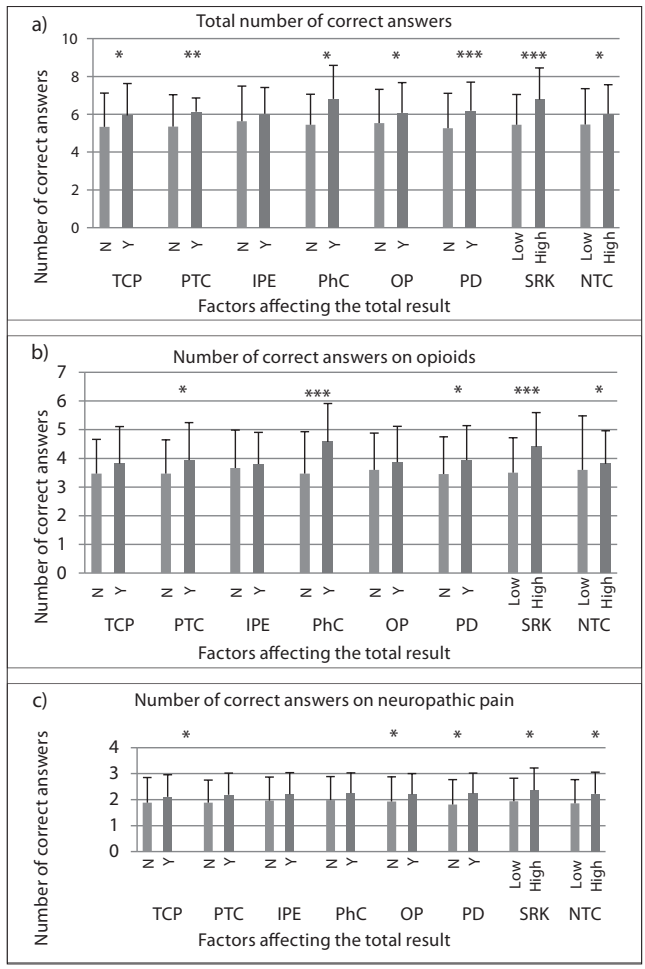

Figure 3. Total number of correct answers for (a), number of correct answers on opioids, (b) number of correct answers on neuropathic pain and (c). TCP- treatment of cancer patients; PTC – participation in training courses; IPE – training courses organised by institutions for physician education; PhC – training carried out by pharmaceutical companies; OP – collaboration with outpatient clinics for pain management; PD – collaboration with palliative outpatient clinics; SRK – self-reported knowledge; NTC – need for training courses (*) $p<0.05$, (**) $p<0.01$, (***) $p<0.001$

DISCUSSION

Among the doctors surveyed, a distinct lack of knowledge was observed about the treatment of chronic pain – only 7 doctors answered all the questions correctly. Previous citations quoted in the 'Introduction' [3, 5, 8, 9, 10, 11, 13, 14, 23] have shown that, both abroad and in Poland [15], there is an inadequate level of basic education for doctors at student level, as well as for those during post-graduate specialisation.

At the moment, the impression is that developments in pain treatment are not matched by doctors' knowledge, and will not lead to significant changes in understanding and pain treatment by doctors of first contact. Only a few publications show that the current levels of pain treatment education are sufficient; however, they still advise that greater emphasis should be placed on collaboration with pain specialists [26].

Attempts have been made to tackle this problem systematically in Poland by publishing appropriate guidelines jointly developed at the College of Family Physicians and Polish Association for the Study of Pain [18], as well as a series of articles on this subject. However, this intervention proved ineffective in raising levels of knowledge [27, 28, 29, 30]. Cabana et al. [31] suggest that doctors generally treat such guidelines as unwarranted and an unnecessary interference in their decision making. This unwillingness is seen no only in the quoted Polish studies, but also abroad, in Sweden [8] and the UK [21], where these observations also confirmed previous studies [8, 10, 32] that a significant part of the respondents were neither aware of national or international recommendations for treating chronic pain.

Not so long ago it was still considered that painkillers should only be given upon request and that powerful opioids should only be used for treating terminal cancer [33]. It took many years to change this practice and doctors are now obliged to use sustained action drugs chosen according to the intensity of pain, but not the diagnosis of the cause [34].

Many researchers [35, 36, 37, 38, 39] have pointed out existing deficiencies in pain treatment during basic medical training which then result in subsequent education proving ineffective in this area [40, 41]. In fact, in 1998 Sloan et al. [42] suggested that post-graduate education conducted in its present form did not actually have any significant effects on advancing a doctor's level of knowledge. Furthermore, a recent study in 2010 [43] recommends that a more effective system of education should be planned for pain management. This, in part, is supported by the presented study; however, among the 50% of respondents who had previously attended training courses, significantly better results were seen in those doctors attending training organised by pharmaceutical companies, compared to those run by medical institutions where no improvements in knowledge were seen.

Despite attempts to introduce new regulations [44], it cannot be ruled out that training provided by pharmaceutical companies places equal stress on promoting its products as well as its basic teaching role on any given core subject. A recently published report by PMR on doctors' attitudes to pharmaco-marketing has shown a marked willingness in participating at conferences organised by the pharmaceutical industry [45].

Identifying those doctors who would benefit from further education is confused by the issue of doctors' willingness to undertake further education seen in those who already have sufficient knowledge as indicated through self-assessment. In addition, the majority of those respondents with lower scores considered further education to be unnecessary. Both these observations are consistent with a previous study [9] which noted the absence of any link between self-assessed knowledge and its actual level within a given tested group. It is suggested that a system of continual education, if diligently applied, might correct the observed shortcomings. This solution, however, needs to be undertaken at national level, as recently proposed [43].

It was expected that doctors treating cancer patients might have a higher level of knowledge on pain management, as in 40-60% cases the occurrence of pain is among the most frequent of symptoms [46]. The literature, however, is divided on this subject; some reports show a much higher level of knowledge on opioids in doctors experienced in treating cancer patients [47], whereas others have not [5]. The presented study confirms that doctors treating cancer patients do indeed have more knowledge of pain management, but without knowledge on opioid use being any higher. It is probably the case that most respondents consider that they have sufficient knowledge gained during their medical study, and do not see the need of expanding this further.

A study by Gallagher et al.[47] has shown that knowledge increases with experience, but this was not seen in the presented study, nor was an increase seen in the knowledge of doctors completing their studies, a finding that has recently been confirmed [5]. These conclusions are disturbing and require attention so that education in this area can be appropriately targeted at medical students and practioners alike.

The doctor's specialisation and the number of correct replies given were unrelated and consistent with other reports [5, 43]. It has also been observed [5] that oncologists rate their knowledge highly in contrast to the findings of the presented study.

A greater number of female than male doctors was noted in this study, which is generally seen in this profession throughout Poland and Europe, both in medical practioners and among medical students [48]. This, however, had no influence on the study results as no differences in correct scoring were detected between the genders

Twenty respondents considered that opioid drugs should only be given by specialists, hence it cannot be excluded that they would treat patients with NSAIDs and weak opioids until patients received clinical referral. Many studies have reported a reluctance to use opioids during treatment [5, 13, 38, 49], thus unnecessarily prolonging the time in which patients suffer from pain only because the doctor is afraid of using this effective therapy.

Although the majority of doctors correctly identified that 400mg of tramadol was the right dosage, nevertheless 43.5% considered that 600mg could be given per 24hrs. This contravenes Polish regulations on maximum allowable doses and therefore constitutes off-label use. The question of maximum dosage for weak-acting opioids is currently a matter of international debate where different countries have different set levels; however, the regulations of each country should be respected. Some of the answers given reflect this general uncertainty. A positive sign was a 78.3% correct scoring in reply to question No. 4 on when to use the 'analgesic ladder' where strong opioids are indicated if tramadol is ineffective. In contrast, 1/5th of respondents would use only strong opioids from the start, in direct opposition to the pain management principles of the WHO [17] which recommend, if necessary, first changing from a weak opioid to a strong one with simultaneous use of NSAIDs and adjuvant drugs. This clearly illustrates a lack of basic and practical knowledge in treating pain that has previously been highlighted by much previous research [8, 9, 10, 11, 15, 49].

The phenomenon of 'opioid-phobia' is still noted worldwide, both among doctors and patients. Changes in attitudes are not helped by the traditional fear of using strong opioids,

(especially at high doses), nor by the law which treats opioids as narcotics/drugs of abuse. The replies to question No. 5 clearly reflects the problem: a clinical example was given which tests the doctors ability to correctly choose, using a higher dose of Fentanyl than that released from the largest applied plaster. Only 37.9% respondents correctly chose to increase the Fentanyl dose above100mmg/h, whereas the majority selected replacing the opioid with morphine. It seems likely that doctors are apprehensive about exceeding maximum doses of the active substance contained within a single pill or plaster. These misgivings are so strong as to incline a change of drug, despite there being no information given in the question's example on any side-effects. This is contradicted with the accepted principle stated in Question No. 4 to increase the intensity of drug action in proportion to the increase in pain intensity, a natural consequence of this being that the dose is increased irrespective of how much is contained within a pill or plaster.

Despite the identified shortcomings, a surprising number of doctors knew in depth about 'breakthrough pain management' where 70% of respondents correctly chose to treat sudden-pain episodes with short-term acting drugs. This is a welcome sign as the subject is still being debated after many years and it would seem to concern mostly those specialists dealing in palliative care and pain therapy. Other studies have shown different results in this area; Gallagher et al [47] showed a 55% correct scoring rate while others [5,9] demonstrated a correct scoring of only 25% and 17%, respectively, concerning opioid treatment in 'rescue medication'.

The high correct scoring in question No. 9 could be construed as doctors being increasing adept at using opioid treatment, if it were not for the lower correct scoring in other related questions. It rather seems that knowledge about opioids is fragmentary where, on the one hand, knowledge on how to treat breakthrough pain is good, as opposed to the reluctance to use the stronger drugs in high doses when merited, as well as not knowing about maximum dosage of 'weak opioids'.

Overall, there are inconsistencies in the appropriate use of opioids which are in keeping with previous studies [10, 35, 43, 47]. Some areas show a deep appreciation of the intricacies of pain therapy (e.g. breakthrough pain management), but basic knowledge on opioid pharmacokinetics and chronic pain management leaves much to be desired.

CONCLUSIONS

According to the sample taken, the presented study demonstrates that the knowledge of doctors in the described subject area is deficient. Appropriate education should be arranged for doctors not routinely dealing in pain management on a daily basis. Further studies are planned to evaluate the level of knowledge in final year medical students. It is hoped that these will enable the education of upcoming doctors to be modified in such a way that chronic pain management becomes more effective and that any further education during later career stages becomes more of an exercise in revision.

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Appendix 1

Question	Percentage of replies
1. The highest daily dose of tramadol allowable in Poland is:	
300 mg	6.9
400 mg	46.3
600 mg	43.8
900 mg	3.0
2. Antidepressants or anti-epileptic drugs in pain management:	
should not be applied	0.0
should be applied by specialists only	10.3
may be incorporated on every level of the analgesic ladder	83.7
may be applied only when other therapeutic methods fail	5.9
3. Opioid analgesics during treatment of chronic pain should be:	
administered on request	11.3
administered only under supervision of medical staff	5.4
administered in proper time intervals	70.4
administered as late as possible	12.8
4. In cases when a patient, in the course of cancerous disease, is treated with non-steroid anti-inflammatory drug and tramadol in maximum doses but the therapy is ineffective the following should be applied:	
incorporate other drug of the NSAIDs group	1.5
increase tramadol dose	2.0
apply strong opioid as the only drug	18.2
replace tramadol with strong opioid	78.3
5. A patient is treated with phentanyl administered intradermally at a dose of 100 µg/daily and ketoprofen at a dose of 200 mg/daily. If the therapy has become no longer effective because all the time the patient experiences strong pain then the following should be applied:	
increase fentanyl dose	37.9
incorporate extended-release morphin	16.7
incorporate tramadol	6.4
Change opioid into extended release morphin	38.9
6. If a patient complains of persistent pain after zoster he had undergone two years earlier then the following should be applied:	
NSAIDs	163
opioids	2.0
anti-epileptic drugs or anti-depressants	33.5
true b) and c) false	48.3
7. Morphine administered intradermally acts for:	
2 hours	2.5
4 hours	67.5
6 hours	26.6
8 hours	3.4
8. If a patient suffers from trigeminal neuralgia, experiences strong 'shooting' and electricizing pain then the following should be applied:	
NSAIDs	13.3
anti-epileptic drugs	71.
physical therapy	6.9
immediate release morphine	7.9
9. A patient is treated with extended-release morphine and for the next several days reports pain episodes lasting for approx. 20 min., which occur 2-3 times daily. The following should then be applied:	
increased doses of morphine	16.7
change of opioid into intradermal fentalnyl	8.9
short-term effect drug (immediate release morphine/NSAIDs)	70.4
further observation of pain complaints	3.9