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Research Paper

Comparison of knowledge on chronic pain amongst healthcare clinicians working in Malta: a nationwide survey

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Abstract

Chronic pain is a prevalent condition affecting 20% of the Maltese population. Studies abroad reported a lack of the clinicians' knowledge of chronic pain management. Locally, studies were limited to the nurses working within specialised settings. This study aimed to determine and compare the level of knowledge on chronic pain and its management amongst doctors, physiotherapists, and nurses in Malta. An online cross-sectional survey was distributed through professional organizations to doctors, nurses, and physiotherapists working in Malta, Europe. The data collection period spanned from September 2020 to November 2020. A

total of 287 participants completed the survey. These represented 3.1% of medical doctors, 1.8% of nurses and 28.1% of physiotherapists. Participants frequently encounter persons with chronic pain (64.1%) in their clinical practice. The questionnaire's median score was 13.0/21 (IQR 12.0 to 15.0). There was a statistically significant difference ($p < 0.001$) in the overall scores of the three professions. Both physiotherapists and doctors achieved the highest median score of 14.0 (physiotherapists IQR 13.0 to 15.0, doctors IQR 12.0 to 15.0), while nurses achieved the lowest score (12.0, IQR 11.0 to 14.0). Overall, there was a homogeneity of knowledge gaps across the participants. These spanned traits of the biomedical model, the risk of addiction to prescribed opioid analgesics and the relationship between pain, behaviour, and disability. Knowledge gaps in managing chronic pain concerned the benefit of transcutaneous electrical nerve stimulation (TENS), pharmacological treatments, and the misbelief to avoid pain-inducing activities. The study identified domains meriting attention by healthcare management as these portray critical educational needs for the three professions. This is the first study to evaluate the level of knowledge on pain and its management across various professions

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in Malta. The research used a previously validated biopsychosocial tool, which identified a homogenous low level of knowledge among the participants. This study adds to the body of literature within the Maltese context that identifies important knowledge gaps for managing persons with chronic pain.

Keywords – *Chronic Pain, Knowledge, Surveys and Questionnaires, Education, Health professionals*

1. Introduction

Low back pain and headache disorders were globally the leading causes of years lived with disability for approximately the past three decades (Abate *et al.*, 2018). Chronic pain imposes a substantial burden on those affected, leading to increased healthcare utilisation (Beyera, O'Brien & Campell, 2019). In Europe, 19% of the population live with moderate to severe chronic pain (Breivik *et al.*, 2006), while a telephone survey carried out in Malta, revealed that 20% of the population suffered from chronic pain (Malta Health Network, 2018). The point prevalence of Maltese persons suffering from low back pain with activity limitations was 6.4% (Cuschieri *et al.*, 2020).

Prior to the 1990s, pain was managed mainly through a biomedical approach where the pain intensity was thought to be proportional to the extent of tissue damage. The last few decades saw the rise of the biopsychosocial model of pain, which is considered more comprehensive (Gatchel *et al.*, 2007). Prem *et al.*, (2011) found that many clinicians still adopted the biomedical model when managing patients suffering from chronic pain. The high prevalence of chronic pain is alarming, demonstrating the need for comprehensive pain education for all healthcare professionals to manage this condition better. The importance of addressing chronic pain is increasingly recognised by national and international governments, and it has become a major priority for various healthcare systems (Fayaz *et al.*, 2016). Pain is not only a health issue but also represents a major contributing factor towards societal well-being.

Studies have evaluated the knowledge of various pain aetiologies among different healthcare professionals. Breuer *et al.*, (2015) evaluated chronic cancer pain amongst oncologists and pain medicine specialists while Eftekhar *et al.*, (2007) assessed the knowledge of the same condition but in physicians. Furthermore, Kumbhare *et al.*, (2018) evaluated the physician's knowledge in the diagnosis and management of fibromyalgia, Karahan

et al., (2014) evaluated the knowledge of nurses on neuropathic pain, Mwanza, Gwisai and Munemo, (2019) assessed the nonpharmacological management of pain in nurses. All these studies identified a lack of knowledge on chronic pain management amongst the various healthcare professionals.

The notion of evaluating knowledge on chronic pain had already been studied nationally in Malta. These studies were conducted solely within the nursing profession (Fleri, 2006), in nurses working within specialised settings (Grech, 2004; Saliba, 2012; Saliba, 2017) and in nursing students (Ghebreslase, 2012). These studies concluded that the participants experienced a lack of knowledge in pain management. However, these studies did not use tools whose content was applicable to various healthcare professionals as it focused solely on pharmacological approaches to pain management and not much about nonpharmacological management. The comparison of knowledge on basic neurophysiological processes and the management of chronic pain should be made through a biopsychosocial approach, since adopting a tool that is focused on the biomedical model or on one treatment approach only will not mirror the latest developments in the field of pain medicine. A multimodal approach is suggested for pain management (Gatchel *et al.*, 2014), requiring professionals with different expertise. Considering the high frequency with which healthcare professionals encounter patients suffering from chronic pain in their daily clinical practice, adequate knowledge on pain management is paramount in reducing the impact of pain (Rice, Smith & Blyth, 2016). Based on the identified gaps, this study aimed to acquire a national overview of the knowledge of chronic pain and its management among Maltese medical doctors, nurses, and physiotherapists. This research sheds light on the clinicians' educational needs in an area that significantly impacts patients' lives (Dahlhamer *et al.*, 2018).

2. Methods

2.1. Study design and sample characteristics

A cross-sectional online survey was distributed via email, using SurveyMonkey® platform, to the total population of Maltese state-registered physiotherapists (n=374), nurses (n=5,637), and medical doctors (n=2,635), excluding dentists. These healthcare clinicians were chosen as previous literature found that these three professions

frequently managed patients with chronic pain (Gatchel *et al.*, 2014; Peng *et al.*, 2008). Participants received an email from an intermediary, and their participation was entirely voluntary. Intermediaries included regulatory councils, professional organisations and places of work. No identifying information was requested to maintain the confidentiality and anonymity of participants.

2.2. Data collection methods

The “chronic pain questionnaire” by Ali and Thomson (2009) was used for this survey. The target population of Ali and Thomson, (2009) were final-year medical and physiotherapy students who would graduate in less than a year. Prior to testing the current population the questionnaire was piloted on seven health professionals undergoing a Master of Science degree in pain who were not involved in the original study, to evaluate this questionnaire’s face, content, and construct validity.

This questionnaire was chosen as it was the only identified questionnaire in the literature that simultaneously addressed the neurophysiological and biopsychosocial model of pain, but also balanced the number of questions on the nonpharmacological and pharmacological management of pain. Hence, it was not skewed towards one aspect or management style. This increased its validity for the target population within our study. Permission to use this questionnaire was obtained from the respective authors and publisher.

The demographics section of the original questionnaire was modified to reflect the target population. Therefore, the place of birth, highest qualification attained, years of clinical experience, method of employment, area of work, and if enlisted in a specialist register were included. Due to these modifications, the current version of the questionnaire consisted of 43 questions rather than the original 35 questions.

The questionnaire (Appendix A) was divided into four sections, with the first part asking about the participants’ demographics (nine questions). The second part (8 questions) examined the participants’ previous training and experiences in dealing with patients with chronic pain. The third part assessed knowledge of the biopsychosocial aspects of chronic pain (12 questions). For the first eight questions the participants had to choose either “true”, “false”, or “I don’t know” responses. The last four questions dealt with the psychosocial aspects of chronic pain and asked for the level of agreement measured on a 3-point Likert scale varying from

“agree,” “neither disagree nor agree”, and “disagree.” The initial nine questions of part four (14 questions) examined the participants’ knowledge of the various aspects of pain management within a biopsychosocial paradigm via the same 3-point Likert scale mentioned above. Question 10, asked to categorically select which professionals should be involved in managing persons with chronic pain. Questions 11 and 14 were open-ended, with the former asking whether some persons have an increased susceptibility to experiencing chronic pain, while the latter probed for any further comments by the participants. Questions 12 and 13 asked the participants about their interest in the field of pain management.

Question 1 of section 4, on transcutaneous electrical nerve stimulation (TENS) initially read as “TENS is considered efficacious in CHRONIC PAIN.” However, this was changed to “TENS has a debatable efficacy in managing chronic pain.” This was done to reflect the latest evidence found in an overview of Cochrane reviews on TENS, which could not identify whether TENS is effective in relieving chronic pain (Gibson *et al.*, 2019).

2.3. Survey administration

Various intermediaries were sought to obtain a maximal distribution of the online questionnaire to the entire population of state registered nurses, physiotherapists and medical doctors. These intermediaries included the registering bodies of each profession, various professional and subspecialty associations, and the heads of service within the public sector for each profession. Two reminder emails were sent, the first after one week and the second after two weeks, aiming to increase the response rate (Sammut, Griscti & Norman, 2021). Duplicate entries were avoided, as users with the same Internet Protocol address were denied access to the survey twice. Furthermore, JavaScript[®] was used to mandatory fill all the questions by demonstrating an alert before the survey could be completed and submitted. The expected duration to complete this survey was approximately 10 minutes. The data collection period spanned from September 2020 to November 2020. Participants were allowed to review and change their answers before submitting the online questionnaire.

2.4. Ethical considerations

An information sheet was provided with the study invitation, including information about survey length, anonymity, potential risks and benefits. No

incentives were offered, participation was voluntary, and participants could retreat from the questionnaire without any consequence. No identification information was collected within the survey. Ethical clearance was sought from the Faculty Research Ethics Committee (FREC FORM V_11022020 4731). The CHERRIES reporting guidelines (Eysenbach, 2004) were used in reporting this study.

2.5. Statistical analysis

The data was downloaded from SurveyMonkey in an Excel file after the data collection period had expired. The data was checked for normality, and none of the variables was normally distributed. Therefore, non-parametric tests were used to analyse such data. Demographical data and the responses for section 1 were tabulated and analysed using descriptive statistics. The number of participants who answered correctly to sections 2 and 3 was presented in tabular form, and any differences in their responses for each question were analysed with the Pearson chi-square test or the Fischer exact test. The Kruskal-Wallis test was used to analyse differences between the three professions in their respective subtotals for sections 2 and 3 and for the overall score. A p-value less than 0.05 was deemed as statistically significant. The total score was derived by adding the binary outcomes from the correct scores for part 3 (knowledge of chronic pain) and part 4 (management of chronic pain) for each participant, calculating the overall median score for all the participants (n=287) and then calculate the median for each profession. Considering that this study did not use negative marking as contrasted to the study by Ali and Thomson, (2009), it was pragmatically envisaged that in the quantitatively marked questions, a binary score of 17 correct responses out of 21 questions or an overall percentage correct score of at least 80% for a professional group would mean a good overall general knowledge about chronic pain and its management within a specific profession. Open-ended questions (Section 1 – Q1, Section 2 – Q 11, 14) were analysed using content analysis. Section 2 (Management) Q10, 12 and 13 were analysed descriptively. A multiple linear regression model was constructed to predict the questionnaires' overall score. Two binary logistic regression models were created to predict who among the participants will obtain an overall median score of 1), at least 13 or 2), 14 or more. The quantitative data were analysed using R version 4.3.1 and its packages {gtsummary} and {ggstatplot}.

3. Results

287 participants completed the entire questionnaire which accounts for 3.1% (2,640) of medical doctors, 1.8% (5,500) of nurses and 28.1% (375) of the physiotherapists in Malta. The participants' demographic data are presented in Table 1. The median age of the participants was of 33.0 (IQR 26.0 to 46.5) years, with a statistically significant difference ($p < 0.001$) in the median age between the three professions, with doctors having the highest age (49.0 IQR 36.0 to 59.8 years), while nurses had the lowest age (30.0 IQR 25.0 to 40.0 years). Overall, 63.1% of the participants were female. The nursing profession had the highest percentage of females (75.8%), while doctors had the lowest percentage (41.5%). Most participants (39.4%) had a Bachelor of Science degree as their highest qualification, while 20.6% had a Master's degree and 3.1% had a PhD. 77.4% of the participants were employed within the public sector. 53.7% of doctors work in the private sector, while 91.9% of nurses and 87.7% of physiotherapists work in the public sector. 27.9% of all the participants work in the acute state hospital, while 19.5% work in the private sector. Being the only profession with a specialist register in Malta, 75.6% of the doctors reported being enlisted in a specialist register, with the General Practitioner speciality being the most popular one (50.0%).

3.1. Experience and teaching received on chronic pain

3.1.1. Knowledge of chronic pain

Only 12.9% of the participants reported the correct definition of chronic pain, as stated by the International Association for the Study of Pain (IASP). The old definition of pain, and thus chronic pain, was still accepted as correct since the new definition was revised in July 2020, which was only a few months shy of the data collection period (Raja *et al.*, 2020). 48.4% of the participants had, have or currently are caring for a family member with chronic pain, but 64.1% of clinicians often encounter chronic pain patients in their clinical practice (Table 2). 73.5% of the participants have read books or articles discussing chronic pain and its management, especially physiotherapists (81.1%). 55.1% of the participants had received between 1 to 15 hours of training/teaching on chronic pain while studying at the undergraduate level. In comparison, 32.4% of the participants had the same amount of teaching hours on the topic at the postgraduate

level. There was a statistically significant difference ($p=0.005$) between the number of physiotherapists (76.4%) and doctors (54.9%) who intend to participate in courses or training on chronic pain.

Question 1 (Chronic pain is closely related to tissue damage) was correctly answered by 45.3% of the participants, with physiotherapists achieving the most correct responses (67.0%) among the three professions ($p<0.001$) (Table 3). Similarly, 54.7% of the participants answered question 2 (Pathology is often identifiable) correctly, with only 34.3% of the nurses providing a correct answer ($p<0.001$). Nearly half of the participants (45.6%) believed that chronic pain can be cured (question 5). There were high correct response rates for questions 6 (93.7%) and 7 (94.8%), which query the role of psychological factors in developing and maintaining chronic pain. Only 5.2% of the participants responded correctly to question 8, which asks about the risk of addiction to prescribed opioids in persons with chronic pain. No significant difference between the three professions was found. Questions 11 and 12, which dealt with behaviour and disability, both got low correct response rates of 8.7% and 4.2%, respectively, from all the participants. Physiotherapists obtained the highest subtotal of 7.5 (IQR 7.0 to 8.0) from a maximum possible score of 12 for section 2, with a statistically significant difference between the three professions ($p<0.001$) (Figure 1).

3.1.2. Management of chronic pain

Questions 1, 3 and 8 in this section obtained the lowest correct response rates (Table 3). Question 1 queried the effect of TENS on managing chronic pain, was answered correctly by 44.6% of the participants, with 63.2% of the physiotherapists ($p<0.001$) achieving a correct score. Approximately half of the participants (55.4%) obtained a correct response for question 3, which asked participants whether pharmacological therapies provided only a minimal effect for chronic pain. Doctors obtained the highest correct responses (81.7%) among the three professions ($p<0.001$). Amongst the nine questions dealing with the management of chronic pain, question 8 obtained the least correct responses from all the participants (13.9%), with physiotherapists achieving the most correct responses (25.5%, $p<0.001$). The response to question 10 showed that a high proportion of participants believe that doctors, physiotherapists, nurses, occupational therapists, psychologists and family and friends should be involved in managing chronic pain

(Table 4). Overall, the least mentioned profession was the nurse (73.5%). Nurses showed that physiotherapists (97.0%) should be involved in the management of chronic pain, while physiotherapists highlighted their role (100.0%) and that of psychologists too (99.1%). Overall, 59.6% answered that they are interested in chronic pain (Q12) and 53.0% of the participants responded that they possibly considered specialising in the field of chronic pain, while 33.1% did not consider it at all for their specialisation (Q13). The median subtotal of this section was 7.0 (IQR 6.0 to 7.0) from a maximum possible score of 9, with both doctors and physiotherapists achieving the highest score (7.0; IQR 6.0 to 7.0, $p<0.001$) (Figure 1).

3.1.3. Overall score

The overall median score for all the participants was 13.0 (IQR 12.0 to 15.0). Nurses obtained the lowest median score of 12.0 (IQR 11.0 to 14.0) out of the three professions (Figure 1). Only 13 participants obtained an overall correct score of at least 17 out of the 21 quantitative questions (81% correct responses).

3.1.4. Regression analysis

Linear and logistic regression analyses were conducted to predict the total score. The multiple linear regression model consisting of profession, age and the recoded variable Qualification_R explained only 16.4% of the variance in the total score. Including the variable employment increased the R^2 value marginally (18.9%).

Two logistic regression models were created to predict who amongst the participants will obtain an overall score of at least 13 (median score for all the participants) or obtain an overall score of 14 or more. For the latter model, the variables profession, age and Qualification_R explained 9.3% of the variance in predicting the participants who will score 14 or more. For the former model, the variables profession and age explained 8.4% of the variance in predicting who of the participants would obtain a score of 13 or higher. An increase in age (years) was associated with a lower score in all three regression models.

Various comparative analyses were conducted between the total score and demographic and questions from section 2 (experience and training of chronic pain). However, none were significant or exhibited no correlation, except for Qualification_R and the total score. The category of participants who had a Master's degree or PhD scored significantly higher (14.01 ± 2.3)

($p=0.0001$) compared to the other participants who reported having a diploma or a first degree only (12.9 ± 2.0). Nevertheless, this only represents a mean difference of 1.1 points.

3.2. Open-ended question

Question 11 revealed that 84.0% of the participants think that certain people are more prone to experience chronic pain. Table 5 illustrates the factors that participants think why such people are more susceptible to experiencing chronic pain, while Table 6 portrays the comments to Q14, which asked for any comments on the management of chronic pain.

4. Discussion

This nationwide survey evaluated the knowledge of chronic pain and its management amongst Maltese doctors, nurses, and physiotherapists. It demonstrates a shared lack of knowledge across the different area: the physiology of chronic pain, the prevailing biomedical model, the relationship between pain, behaviour and disability, and the treatment options. The low overall median score of 13.0 from a possible maximum score of 21, echoes the results of a meta-analysis of 18 studies evaluating the knowledge of pain among nurses (Ortiz *et al.*, 2022). In our cohort, approximately two-thirds of the participants often encounter persons suffering from chronic pain in their clinical practice and a large proportion of the participants have shown an interest in the field of pain management by reading books or stated the intent to participate in training courses, yet in reality only 36.9% have attended courses or received training on the topic portraying a mismatch between the interest shown and the actual knowledge.

4.1. The biopsychosocial nature of pain

The updated definition of pain (Raja *et al.*, 2020) encapsulates the well-known sensory dimension of pain and the affective, cognitive and social dimensions, learning aspects, pain threat, and the difference between nociception and pain. The lack of knowledge on defining pain (87.1% did not provide a correct definition) might have repercussions in the proper management of such persons through the heuristic biopsychosocial model of pain (Gatchel *et al.*, 2007). Nonetheless, several of those who failed to provide a correct definition mentioned its persistence and that it lasts more than 3 or 6 months.

The dominance of the biomedical model of pain is evident from the poor responses to questions 1 and 2 of section 2. The biomedical model assumes a linear relationship between the extent of tissue damage and pain, urging the clinician to search well to identify the underlying pathology. Usually, such beliefs lead to numerous tests and scans being ordered to identify the physical pathology (Sajid, Parkunan & Frost, 2021). Possible genetic factors (Freidin *et al.*, 2019) and well-known psychosocial and environmental aspects must be considered when managing such persons (Talbot *et al.*, 2019).

Regarding the curability of chronic pain, Price *et al.*, (2019) showed that within UK pain clinics, 92% of the patients continue to experience significant pain at one-year follow-up. Therefore, the Methods, Measurement, and Pain Assessment in Clinical Trials (IMMPACT) (Beale, Cella & de C. Williams, 2011; Dworkin *et al.*, 2009) recommends that a 50% analgesic effect should be considered as an excellent outcome. Due to the numerous biopsychosocial factors underlying chronic pain, if clinicians focus on curing chronic pain, they will instil false expectations within their patients, which will negatively impact them (Woolf, 2012).

Most participants believe that persons with chronic pain have a high risk of addiction to prescribed opioid analgesics. However, the incidence of opioid addiction is small (0.27%) (Noble *et al.*, 2010). Since in Malta, doctors are the sole legal prescribers, this might reflect a reluctance to prescribe opioids for chronic pain due to fears of addiction (Heit, 2003). The analgesic effect of opioids in chronic pain is controversial since some studies reported benefits lasting only up to 12 weeks, (McNicol *et al.*, 2013; Schembri, 2019), whilst others sustain that opioids provide long-term analgesia (Karmali *et al.*, 2020).

A large proportion of the participants believe that chronic pain complications result from unhelpful learning behaviours in dealing with pain. Apart from the learning aspects, which is influenced by social and environmental factors, complications can result from genetic factors and the sensitisation process (Fillingim, 2017; Roden *et al.*, 2011). Genetic factors underlie the pain sensitisation and modulation processes, and enzyme polymorphisms (Zhou, 2009), with the latter affecting drug pharmacokinetics (Magarbeh *et al.*, 2021). Thus, the resultant pharmacodynamics can differ significantly between persons, leading to different analgesic potencies (Lucchetti & Lucchetti, 2016). Other factors can lead to

drug-induced complications, for example, older age, comorbidities, cognition, culture and polypharmacy.

Most of the participants exhibited a false belief that chronic pain leads to disability. There is only a slight direct relationship between pain and disability (Luque-Suarez, Martinez-Calderon & Falla, 2019). Crombez *et al.*, (1999) stated that “pain-related fear is more disabling than pain itself” especially fear related to underlying tissue damage (Buchbinder *et al.*, 2020). Furthermore, various confounders can mediate the relationship between pain and disability, including coping strategies, self-efficacy, pain acceptance and pain intensity. Fluctuations in pain severity could even be more disabling than the actual activity level (Huijnen *et al.*, 2009).

4.2. The management of chronic pain

Three main areas obtained a low score amongst the participants. The first relates to the analgesic efficacy of TENS in chronic pain. An overview of Cochrane reviews (Gibson *et al.*, 2019) could not state whether TENS successfully relieves chronic pain, mainly due to methodological issues related to inadequate evidence and the placebo effect. TENS depends on the efficient descending pain modulating system (Gibson *et al.*, 2019), which can be impaired in persons with chronic pain (Gerhardt *et al.*, 2017). Physiotherapists scored the highest (63.2%) on this question since they are more familiar with TENS as this modality is part of their undergraduate degree and is commonly used in their clinical practice. The second area relates to the magnitude of the effect of pharmacological treatments. In certain instances, pharmacological analgesia might pose a higher risk for adverse effects (Ferreira *et al.*, 2023); however, in appropriately selected cases, the benefits outweigh the risks as it can improve quality of life (Busse *et al.*, 2018). Thirdly, clinicians might encourage patients to avoid pain-inducing activities, fostering fear-avoidance beliefs, hypervigilance and inactivity among patients, which perpetuate the chronic pain cycle (Zale *et al.*, 2013) due to maladaptive behavioural strategies (Gatchel *et al.*, 2014). Most participants believe a multidisciplinary team approach should be promoted. Interestingly, the nursing profession obtained the lowest rank (73.5%). Nonetheless, nurses have a role in chronic pain management by supporting persons suffering from chronic pain, administering treatment and liaising with the rest of the multidisciplinary team (Brown, 2013).

4.3. Open-ended questions

Most of the participants (84.0%) think that some persons are more susceptible to experiencing chronic pain, mainly due to psychological factors (40.0%), genetics (9.1%) and medical comorbidities (6.3%). The comorbid nature of chronic pain with psychological factors is well documented (Mullins, Yong & Bhattacharyya, 2023). However, their causative nature is still debated, and a shared neurobiology with an underlying genetic predisposition seems to provide a better explanation (Hooten, 2016). Other modifiable and non-modifiable risk factors for chronic pain were also mentioned by our cohort, e.g. obesity, occupation, and lifestyle factors. All these aspects are important epidemiological factors for chronic pain (van Hecke, Torrance & Smith, 2013). The need for further education, the refractory nature of chronic pain and the importance of soft skills and adopting a multidisciplinary approach were also highlighted. The poor outcomes when managing chronic pain are well documented despite adopting a multidisciplinary team approach and evidence-based guidelines, such as in UK pain clinics (Price *et al.*, 2019).

4.4. Homogeneity of knowledge among clinicians

There was a statistically significant difference in the overall median score of the three professions, albeit nurses scored only 2.0 points less than the other two professions. It is evident that four questions (Knowledge – Q 8, 11, 12 and Management – Q8) lowered the total score for nearly all participants, while approximately half of the participants answered another five questions (Knowledge – Q1, 2, 5 and Management – Q1, 3) incorrectly. Hence, concerning specific topics on chronic pain, the three professions homogeneously share knowledge but also share a lack of knowledge in other common areas. This notion of shared knowledge amongst the professionals was further evidenced by the regression analysis, which did not reveal any predicting variables except Qualification_R. However, the mean difference was only 1.11 points between the two recoded categories of Qualification_R, further highlighting the point that since the professionals work together, their knowledge is shared. Besides, in our cohort, an increase in age (years) was associated with a lower score in all four regression models. This might be explained since the biopsychosocial model of pain, despite being developed in the 1980s, became known in the Maltese healthcare

scene in the last 20 years. Hence older participants/clinicians would not have been given as much training as their younger counterparts.

The homogeneity of knowledge and the lack thereof, which is evident in our cohort, is illustrated in various other studies. The aspects in which there was a shared lack of knowledge depended on the survey tool and the professional group being studied. For example, Mu *et al.*, (2013) found that collectively Chinese rheumatologists (n=707) lacked awareness of and the perception of fibromyalgia, especially its diagnostic criteria. Lalonde *et al.*, (2014) concluded that overall, Canadian physicians working in primary care (n=137) had a low level of knowledge pertaining to assessment, treatment goals, and long-term management of chronic non-cancer pain. Breuer *et al.*, (2015) conducted a nationwide survey in the US among pain medicine specialists, oncologists and specialists in palliative medicine and hospice (n=550), and they concluded that overall, the participants had insufficient knowledge of the management of cancer pain. Italian physiotherapists lacked the knowledge and skills to apply the biopsychosocial model in persons with chronic low back pain (Zangoni & Thomson, 2017). Karahan *et al.*, (2014) found that amongst Turkish nurses (n=60), ≥80% of nurses did not have sufficient knowledge of the definition, the aetiologies, the symptoms and the management of neuropathic pain. Among nurses working in a single hospital in Zimbabwe (n=75), there was a collective lack of knowledge about the non-pharmacological methods of pain management (Mwanza, Gwisai & Munemo, 2019). Similarly, Canadian family medicine nurses (n=53) exhibited a homogenous lack of knowledge and misleading beliefs on the pharmacological management of chronic noncancer pain (Bergeron, Bourgault & Gallagher, 2015). Nurses working within emergency departments (n=571) in the US obtained a mean score of 36.6 out of 60 in the Know Pain-12 questionnaire while three negative beliefs emerged from the Pain Myth Scale, being the dependency on analgesics, exaggeration of the pain levels and not believing patients who exhibit a mismatch between their daily activity and high pain levels (Martorella *et al.*, 2019).

5. Strengths and Limitations

The current study used a standardised structured questionnaire that was initially designed for final-year medical and physiotherapy students, but within this survey, it was used in experienced clinicians (median clinical experience 9.0 years). Since this tool is

designed for undergraduate students, it was considered appropriate for qualified professionals. The tool embraces a biopsychosocial model, ensuring it does not exhibit bias towards any particular profession or treatment approach. Besides, Ali and Thomson (2009) adopted negative marking, yet they did not provide details on how this was implemented. Hence, direct comparison of our results to theirs was not possible. The low response rate of doctors (3.1%) and nurses (1.8%) could reflect an interest bias or this could have occurred since the total population of nurses and doctors is by far much higher than that of physiotherapists. The time required to finish the survey could also explain the low response rate. Difficulties with the questionnaire distribution through intermediaries and not having the correct contact details might have impacted the response rate. On the other hand, the high response rate amongst physiotherapists (45.0%) working in Malta is a strength, enhancing the generalisability of our results to this subsection of the population. Furthermore, the data collection period spanned from September 2020 to November 2020. Performing it earlier would have probably risked further lowering the response rate due to the COVID pandemic or being on summer holidays.

Conclusion

This was the first study to measure various health professionals' knowledge of the biopsychosocial management of chronic pain patients in Malta. The study identified domains meriting attention by healthcare management as these portray critical educational needs for the three professions that frequently manage persons with chronic pain within their clinical duties. The salient aspects requiring urgent attention amongst the entire population of clinicians are the need to improve knowledge on the biopsychosocial model of pain, the risk of addiction to prescribed opioid analgesics and the relationship between pain, behaviour, and disability, the analgesic effect of TENS and pharmacological treatments and the misbelief to avoid pain-inducing activities. Considering the positive impact of biopsychosocial pain education on healthcare professionals in ameliorating attitudes, knowledge and clinical behaviour (Mankelov *et al.*, 2022), this study highlights the need to increase knowledge across different healthcare settings through interdisciplinary training on pain management.

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Tables

Table 1. Demographic characteristics of the participants

Variable	Overall, N=287	Doctor, N=82	Nurse, N=99	Physiotherapist, N=106	p-value
Age Median (IQR)	33.0 (26.0, 46.5)	49.0 (36.0, 59.8)	30.0 (25.0, 40.0)	30.5 (25.3, 36.0)	<0.001†
Clinical experience Median (IQR)	9.0 (4.0, 21.5)	22.5 (10.3, 35.0)	7.0 (3.0, 18.0)	7.8 (3.0, 12.8)	<0.001†
Gender n (%)					<0.001†
Female	181.0 (63.1)	34 (41.5)	75 (75.8)	72.0 (67.9)	
Male	106.0 (36.9)	48 (58.5)	24 (24.296)	34.0 (32.1)	
Place of birth n (%)					0.18*
Malta	253 (88.2)	77 (93.9)	81 (81.8)	95 (89.6)	
European Union	15 (5.2)	2 (2.4)	8 (8.1)	5 (4.7)	
Other	19 (6.6)	3 (3.7)	10 (10.1)	6 (5.7)	
Qualification n (%)					
Diploma	30 (10.5)	0 (0.0)	28 (28.3)	2 (1.9)	
BSc (Hons)	113 (39.4)	0 (0.0)	53 (53.5)	60 (56.6)	
Doctor of Medicine (MD)	44 (15.3)	44 (53.7)	0 (0.0)	0 (0.0)	
Pg Certificate/Diploma	28 (9.8)	19 (23.2)	4 (4.0)	5 (4.7)	
Master	59 (20.6)	12 (14.6)	11 (11.1)	36 (34.0)	
PhD/Doctorate	9 (3.1)	6 (7.3)	0 (0.0)	3 (2.8)	
Other	4 (1.4)	1 (1.2)	3 (3.0)	0 (0.0)	
Employment n (%)					<0.001*
Public Sector	222 (77.4)	38 (46.3)	91 (91.9)	93 (87.7)	
Private Sector	64 (22.3)	44 (53.7)	7 (7.1)	13 (12.3)	
Not practicing anymore	1 (0.3)	0 (0.0)	1 (1.0)	0 (0.0)	

Variable	Overall, N=287	Doctor, N=82	Nurse, N=99	Physiotherapist, N=106	p-value
Work n (%)					
Main acute hospital	80 (27.9)	18 (22.0%)	43 (43.4)	19 (17.9)	
Private sector	56 (19.5)	43 (52.4%)	3 (3.0)	10 (9.4)	
Primary healthcare	32 (11.1)	13 (15.9%)	8 (8.1)	11 (10.4)	
Rehabilitation hospital	21 (7.3)	2 (2.4%)	5 (5.1)	14 (13.2)	
Residential care	18 (6.3)	0 (0.0%)	10 (10.1)	8 (7.5)	
Physiotherapy outpatients	15 (5.2)	0 (0.0%)	0 (0.0)	15 (14.2)	
Community care	14 (4.9)	3 (3.796)	4 (4.0)	7 (6.6)	
Oncology	12 (4.2)	0 (0.096)	6 (6.1)	6 (5.7)	
General hospital	12 (4.2)	1 (1.2%)	5 (5.1)	6 (5.7)	
Mental Health services	8 (2.8)	1 (1.2%)	7 (7.1)	0 (0.0)	
Paediatric services	8 (2.8)	0 (0.0%)	0 (0.0)	8 (7.5)	
Abroad on internship/fellowship	1 (0.3)	0 (0.096)	1 (1.0)	0 (0.0)	
Other	10 (3.5)	1 (1.2%)	7 (7.1)	2 (1.9)	

† Pearson's Chi-squared test

* Fisher's exact test

† Kruskal-Wallis rank sum test

Table 2. Experience and teaching received on chronic pain (% yes)

Question	Overall, N=287	Doctor, N=82	Nurse, N=99	Physiotherapist, N=106	p-value [†]
Q2. Have you had/have/currently caring for a family member living with chronic pain? n (%)	139 (48.4)	45 (54.0)	47 (47.5)	47 (44.3)	0.3

Question	Overall, N=287	Doctor, N=82	Nurse, N=99	Physiotherapist, N=106	p-value [†]
Q.3. In your clinical practice, how often do you encounter persons living with chronic pain? n (%)					0.2
Rarely	22 (7.7)	3 (3.7)	11 (11.1)	8 (7.5)	
Sometimes	81 (28.2)	26 (31.7)	32 (32.3)	23 (21.7)	
Often	149 (51.9)	45 (54.9)	43 (43.4)	61 (57.5)	
Always	35 (12.2)	8 (9.8)	13 (13.1)	14 (13.2)	
Q.4. Have you read any book/articles discussing chronic pain and its management? n (%)	211 (73.5)	62 (75.6)	63 (63.6)	86 (81.1)	0.016
Q.5. How many hours of training/teaching at undergraduate level have you received on chronic pain and its management? n (%)					
0	41 (14.3)	18 (22.0)	21 (21.2)	2 (1.9)	
1 to 15	158 (55.1)	42 (51.2)	61 (61.6)	55 (51.9)	
16 to 30	34 (11.8)	7 (8.5)	6 (6.1)	21 (19.8)	
31 to 60	8 (2.8)	2 (2.4)	2 (2.0)	4 (3.8)	
>60	8 (2.8)	1 (1.2)	1 (1.0)	6 (5.7)	
Do not remember	38 (13.2)	12 (14.6)	8 (8.1)	18 (17.0)	
Q.6. Have you attended courses or training on chronic pain management? n (%)	106 (36.9)	32 (39.0)	15 (15.2)	59 (55.7)	<0.001
Q.7. How many hours of training/teaching at postgraduate level have you received on chronic pain and its management? n (%)					
0	130 (45.3)	26 (31.7)	71 (71.7)	33 (31.1)	

Question	Overall, N=287	Doctor, N=82	Nurse, N=99	Physiotherapist, N=106	p-value [†]
1 to 15	93 (32.4)	31 (37.8)	18 (18.2)	44 (41.5)	
16 to 30	27 (9.4)	12 (14.6)	3 (3.0)	12 (11.3)	
31 to 60	13 (4.5)	2 (2.4)	2 (2.0)	9 (8.5)	
>60	7 (2.4)	2 (2.4)	1 (1.0)	4 (3.8)	
Do not remember	17 (5.9)	9 (11.0)	4 (4.0)	4 (3.8)	
Q.8. Do you intend to participate in courses or training on chronic pain management? n (%)	197 (68.6)	45 (54.9)	71 (71.7)	81 (76.4)	0.005

[†] Pearson's Chi-squared test

Table 3. Knowledge, management subscores and overall score (% correct)

Question	Overall, N=287	Doctor, N=82	Nurse, N=99	Physiotherapist, N=106	p-value
K.Q.1. Chronic pain is closely related to tissue damage. n (%)	130.0 (45.3)	24.0 (29.3)	35.0 (35.4)	71.0 (67.0)	<0.001[†]
K.Q.2. Pathology is often identifiable. n (%)	157.0 (54.7)	49.0 (59.8)	34.0 (34.3)	74.0 (69.8)	<0.001[†]
K.Q.3. It results in changes in the Central Nervous System. n (%)	224.0 (78.0)	61.0 (74.4)	70.0 (70.7)	93.0 (87.7)	0.008[†]
K.Q.4. Repeated unsuccessful attempts to relieve the pain may result in hypervigilance (high alert) to pain. n (%)	217.0 (75.6)	70.0 (85.4)	64.0 (64.6)	83.0 (78.3)	0.004[†]
K.Q.5. Chronic pain can be cured. n (%)	131.0 (45.6)	35.0 (42.7)	57.0 (57.6)	39.0 (36.8)	0.009[†]
K.Q.6. Psychological factors play a major role in its development. n (%)	269.0 (93.7)	78.0 (95.1)	86.0 (86.9)	105.0 (99.1)	0.001[†]
K.Q.7. Psychological factors play a major role in its maintenance. n (%)	272.0 (94.8)	78.0 (95.1)	90.0 (90.9)	104.0 (98.1)	0.066 [†]

Question	Overall, N=287	Doctor, N=82	Nurse, N=99	Physiotherapist, N=106	p-value
K.Q.8. Risk of addiction to prescribed opioid analgesics to chronic pain patients is quite high. n (%)	15.0 (5.2)	6.0 (7.3)	6.0 (6.1)	3.0 (2.8)	0.34*
K.Q.9. It is an interaction of physical, psychological, and social factors. n (%)	256.0 (89.2)	77.0 (93.9)	76.0 (76.8)	103.0 (97.2)	<0.001 [†]
K.Q.10. Cultural and social backgrounds influence pain perception. n (%)	225.0 (78.4)	62.0 (75.6)	64.0 (64.6)	99.0 (93.4)	<0.001 [†]
K.Q.11. Complications are the result of unhelpful learning behaviours in dealing with pain and its consequences. n (%)	25.0 (8.7)	8.0 (9.8)	17.0 (17.2)	0.0 (0.0)	<0.001*
K.Q.12. Prolonged pain leads to disability. n (%)	12.0 (4.2)	4.0 (4.9)	5.0 (5.1)	3.0 (2.8)	0.76*
M.Q.1. TENS has a debatable efficacy in managing chronic pain. n (%)	128.0 (44.6)	26.0 (31.7)	35.0 (35.4)	67.0 (63.2)	<0.001 [†]
M.Q.2. Exercise and lifestyle interventions should be considered. n (%)	282.0 (98.3)	80.0 (97.6)	96.0 (97.0)	106.0 (100.0)	0.23 [†]
M.Q.3. There is little to be gained from pharmacological treatments. n (%)	159.0 (55.4)	67.0 (81.7)	53.0 (53.5)	39.0 (36.8)	<0.001 [†]
M.Q.4. Chronic pain is best treated using a multidisciplinary approach. n (%)	275.0 (95.8)	81.0 (98.8)	91.0 (91.9)	103.0 (97.2)	0.063 [†]
M.Q.5. Complementary therapies have beneficial outcomes for some types of chronic pain. n (%)	258.0 (89.9)	76.0 (92.7)	94.0 (94.9)	88.0 (83.0)	0.011[†]
M.Q.6. Nerve Blocks will prevent pain on a short-term basis. n (%)	201.0 (70.0)	65.0 (79.3)	67.0 (67.7)	69.0 (65.1)	0.090 [†]
M.Q.7. Special attention must be paid to patient education on coping strategies. n (%)	285.0 (99.3)	82.0 (100.0)	98.0 (99.0)	105.0 (99.1)	>0.99 [†]

Question	Overall, N=287	Doctor, N=82	Nurse, N=99	Physiotherapist, N=106	p-value
M.Q.8. Patients should be encouraged to avoid pain-inducing activities. n (%)	40.0 (13.9)	7.0 (8.5)	6.0 (6.1)	27.0 (25.5)	<0.001[†]
M.Q.9. Cognitive Behavioural Therapy can modify maladapted, distorted feelings, beliefs and behaviours. n (%)	218.0 (76.0)	74.0 (90.2)	64.0 (64.6)	80.0 (75.5)	<0.001[†]

[†]Pearson's Chi-squared test; *Fisher's exact test; [‡]Kruskal-Wallis rank sum test

Table 4. The multidisciplinary team and interest in the management of chronic pain

Questions	Overall, N=287	Doctor, N=82	Nurse, N=99	Physiotherapist, N=106	p-value
Q10. What professions should be involved in the management of chronic pain? (You can tick one or more as necessary) n (%)					
Doctor	274 (95.5)	80 (97.6)	94 (94.9)	100 (94.3)	
Physiotherapist	280 (97.6)	78 (95.1)	96 (97.0)	106 (100.0)	
Nurse	211 (73.5)	57 (69.5)	85 (85.9)	69 (65.1)	
Occupational therapist	236 (82.2)	74 (90.2)	85 (85.9)	77 (72.6)	
Psychologist	264 (92.0)	73 (89.0)	86 (86.9)	105 (99.1)	
Family and friends	246 (85.7)	65 (79.3)	82 (82.8)	99 (93.4)	
Q12. Is the area of chronic pain something you are interested in? n (%)					0.36 [†]
Uninterested	11.0 (3.8)	6.0 (7.3)	2.0 (2.0)	3.0 (2.8)	
Slightly interested	105.0 (36.6)	30.0 (36.6)	32.0 (32.3)	43.0 (40.6)	
Interested	120.0 (41.8)	35.0 (42.7)	46.0 (46.5)	39.0 (36.8)	
Very interested	51.0 (17.8)	11.0 (13.4)	19.0 (19.2)	21.0 (19.8)	

Questions	Overall, N=287	Doctor, N=82	Nurse, N=99	Physiotherapist, N=106	p-value
Q13. How seriously would you consider it as a speciality after qualifying? n (%)					0.005 †
Not at all	95.0 (33.1)	40.0 (48.8)	19.0 (19.2)	36.0 (34.0)	
Do not know	40.0 (13.9)	10.0 (12.2)	17.0 (17.2)	13.0 (12.3)	
Possibly	111.0 (38.7)	25.0 (30.5)	46.0 (46.5)	40.0 (37.7)	
Definitely	41.0 (14.3)	7.0 (8.5)	17.0 (17.2)	17.0 (16.0)	
† Fisher's exact test					
† Pearson's Chi-squared test					

Table 5. Predisposing factors for developing chronic pain according to the participants

Themes	Overall, N=287	Doctor, N=82	Nurse, N=99	Physiotherapist, N=106	p-value ¹
Yes n (%)	241 (84.0)	74 (90.2)	70 (70.7)	97 (91.5)	0.014
Psychological factors n (%)	109 (40.0)	36 (4.4)	17 (17.1)	56 (52.8)	
Genetic predisposition n (%)	26 (9.1)	10 (12.2)	10 (10.1)	6 (5.7)	
Medical comorbidities n (%)	18 (6.3)	4 (4.9)	10 (10.1)	4 (3.8)	
Reduction in pain threshold n (%)	16 (5.6)	4 (4.9)	6 (6.1)	6 (5.7)	
Occupation factors n (%)	14 (4.9)	3 (3.7)	8 (8.1)	3 (2.8)	
Growing older n (%)	5 (1.7)	0 (0.0)	5 (5.1)	0 (0.0)	
Lifestyle factors n (%)	12 (4.2)	2 (2.4)	6 (6.1)	4 (3.8)	
Environment factors n (%)	19 (6.6)	3 (3.7)	1 (1.0)	15 (0)	
Socioeconomic n (%)	8 (2.8)	1 (1.2)	0 (0.0)	7 (6.6)	
Obesity n (%)	8 (2.8)	1 (1.2)	5 (5.1)	2 (2.8)	
Biopsychosocial n (%)	7 (2.5)	1 (1.2)	1 (1.0)	5 (5.7)	
Others n (%)	12 (4.2)	3 (3.7)	6 (6.1)	3 (2.8)	
¹ Kruskal-Wallis rank sum test					

Table 6. Further comments – Q14

Themes	Overall, N=287	Doctor, N=82	Nurse, N=99	Physiotherapist, N=106
No	200 (69.7)	48 (58.5)	69 (69.7)	82 (78.3)
More Education needed	25 (8.7)	5 (6.1)	9 (9.1)	11 (10.4)
Difficult to treat	11 (3.8)	6 (7.3)	2 (2.0)	3 (2.8)
The importance of listening and communication skills	7 (2.4)	0 (0.0)	3 (3.0)	4 (3.8)
Need of involvement of the Multidisciplinary Team	6 (2.1)	4 (4.9)	1 (1.0)	1 (1.0)
More research needed	4 (1.4)	0 (0.0)	1 (1.0)	3 (2.8)
Miscellaneous	34 (11.8)	18 (22.0)	14 (14.1)	2 (1.9)

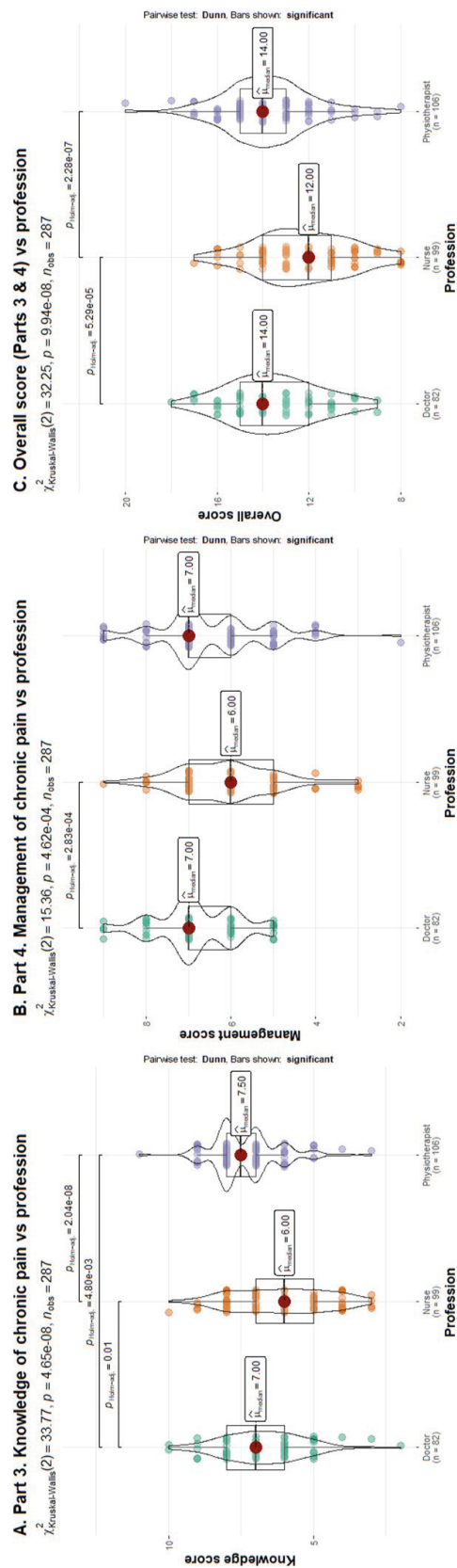


Figure 1. A: the score for section 3: knowledge on the biopsychosocial aspects of chronic pain, B: score for the knowledge on the biopsychosocial management of chronic pain, C: the overall score combining the scores of parts 3 and 4 together.

Survey demographics and questions - Appendix A

1. Demographics:

Questions related to the health professionals' demographics will include:

1. What's your current occupation?

- a. Nurse
 b. Doctor
 c. Physiotherapist

2. What is your age?

3. Gender:

- Male
 Female
 Other

4. Place of birth:

- a. Malta
 b. European Union
 c. Other

5. Highest qualification attained:

- a. Diploma
 b. Bachelor of Science (Hons)
 c. Doctor of Medicine (MD)
 d. Post-graduate certificate/diploma
 e. Master
 f. PhD/Doctorate
 g. Other (please specify)

6. Years of clinical experience:

7. Method of employment:

- a. Public Sector
 b. Private Sector
 c. Not practicing anymore
 d. Voluntary work
 e. Other (please specify)

8. The current area of work:

- a. AACC CommCare Community/Residential
 b. Acute Hospital (MDH)
 c. SAMOC- Oncology

- d. SVP
 e. Boffa Hospital (residential)
 f. St Luke's Physiotherapy Outpatients' Department
 g. Rehab Hospital Karen Grech
 h. CDAU
 i. Gozo General Hospital
 j. Mount Carmel Hospital
 k. Primary Health Centres
 l. Private Sector
 m. Abroad on internship/fellowship
 n. Others: Please specify:

9. Are you enlisted in a specialist register? If yes, please specify the name of the register.

Survey questions will include:

2. Experience and teaching received on CHRONIC PAIN

1. How do you define pain and hence chronic pain?

2. Have you had/have/currently caring for a family member living with chronic pain?

- Yes
 No

3. In your clinical practice, how often do you encounter persons living with chronic pain?

- Never
 Rarely
 Sometimes
 Often
 Always

4. Have you read any books/articles discussing chronic pain and its management?

- Yes
 No

5. How many hours of training/teaching at undergraduate level have you received on chronic pain and its management?

6. Have you attended courses or training on chronic pain management?

Yes
 No

7. How many hours of training/teaching at postgraduate level have you received on chronic pain and its management?

8. Do you intend to participate in courses or training on chronic pain management?

Yes
 No

3. Knowledge of CHRONIC PAIN

For each of the following statements about CHRONIC PAIN, please indicate whether you think they are true, false, or you don't know.

Statement

1. CHRONIC PAIN is closely related to tissue damage.

2. Pathology is often identifiable.

3. It results in changes in the Central Nervous System.

4. Repeated unsuccessful attempts to relieve the pain may result in hypervigilance (high alert) to pain.

5. CHRONIC PAIN can be cured

6. Psychological factors play a major role in its development

7. Psychological factors play a major role in its maintenance.

8. Risk of addiction to prescribed opioid analgesics to CHRONIC PAIN patients is quite high.

For each of the following statements on CHRONIC PAIN, please indicate your level of agreement (agree, neither disagree nor agree, disagree).

9. It is an interaction of physical, psychological, and social factors.

10. Cultural and social backgrounds influence pain perception.

11. Complications are the result of unhelpful learning behaviours in dealing with pain and its consequences.

12. Prolonged pain leads to disability

4. Management of CHRONIC PAIN

For each of the following statements on the management approaches of CHRONIC PAIN, please indicate your level of agreement (agree, neither disagree nor agree, disagree).

Statement

1. TENS has a debatable efficacy in managing CHRONIC PAIN.

2. Exercise and lifestyle interventions should be considered.

3. There is little to be gained from pharmacological treatments.

4. CHRONIC PAIN is best treated using a multidisciplinary approach.

5. Complementary therapies have beneficial outcomes for some types of CHRONIC PAIN

6. Nerve Blocks will prevent pain on a short- term basis.

7. Special attention must be paid to patient education on Coping strategies.

8. Patients should be encouraged to avoid pain-inducing activities.

9. Cognitive Behavioural Therapy can modify maladapted, distorted feelings, beliefs and behaviours.

10. What professions should be involved in the management of CHRONIC PAIN? (you can tick one or more as necessary)

- Physician
- Nurse
- Physiotherapist
- Occupational therapist
- Psychologist
- Family/Friends

11. Do you think that some people are more prone to getting CHRONIC PAIN? Please state briefly the reasons for your answer.

12. Is the area of CHRONIC PAIN something you are interested in?

- a. Very interested
- b. Interested
- c. Slightly interested
- d. Uninterested

13. How seriously would you consider it as a speciality after qualifying?

- a. Definitely
- b. Possibly
- c. Not at all
- d. Don't know

14. Are there any other comments you would like to make about CHRONIC PAIN?

Thank you for your time.



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