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► To cite this version:

H. Mhadhbi, B. Thierry-Hildenbrand, J. Draper-Rodi, J.E. Esteves, Mathieu Ménard. Pain knowledge and fear-avoidance beliefs of French osteopathy students and educators towards chronic low back pain: An osteopathic educational institution-based cross-sectional survey. *International Journal of Osteopathic Medicine*, 2021, 42, pp.61-68. 10.1016/j.ijosm.2021.12.002 . hal-03557557

HAL Id: hal-03557557

<https://hal.science/hal-03557557>

Submitted on 22 Feb 2022

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Title page

Pain knowledge and fear-avoidance beliefs of French osteopathy students and educators towards chronic low back pain: An Osteopathic Educational Institution-based cross-sectional survey.

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Journal Pre-proof

TITLE

Pain knowledge and fear-avoidance beliefs of French osteopathy students and educators towards chronic low back pain: *An Osteopathic Educational Institution-based cross-sectional survey.*

ABSTRACT

Background: Practitioners' fear-avoidance beliefs can influence positively or negatively therapeutic outcomes in their patients. This study reports pain knowledge and fear-avoidance beliefs of French osteopathy students and educators towards the management of chronic low back pain (cLBP).

Methods: An online cross-sectional survey was proposed to educators and students. It included sociodemographic characteristics and two questionnaires: the FABQ-HC to assess beliefs on the effects of physical and work activities for people with cLBP, and the NPQ to assess participants' knowledge of pain.

Results: Participants (N=172) had mean FABQ-HC subscale scores of 11.02 ± 4.44 (Physical activity) and 24.37 ± 11.78 (Work). The mean NPQ total score was 11.90 ± 2.05 . There were no significant score differences between students and educators ($p > 0.05$). Results showed that Year 4 students (N=65) had a significantly better score ($p < 0.05$) at the FABQ-HC Physical Activity than Year 5 students (N=71). Educators (N=36) having less than 10 years of practice in osteopathy had better scores than other educators ($p < 0.01$) at the FABQ-HC Work. Educators and students in the study show similar scores to other French HCPs and international osteopaths on the FABQ-HC Physical activity. In contrast, they scored lower on the FABQ-HC Work.

Conclusions: The main finding was that educators and students belonging to the same OEI have no significantly different beliefs about cLBP and no significantly differing

knowledge of pain. There is potential to improve pain education especially concerning the beliefs around cLBP concerning work activity.

KEYWORDS

Osteopathic Medicine

Beliefs

Chronic pain

Low back pain

Education

FUNDING SOURCES

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

BACKGROUND

Chronic low back pain (cLBP) has been identified as one of the leading global causes of disability throughout the world associated with significantly reduced quality of life with those affected for both physical and mental aspect [1]. In a recent population-based survey conducted on 17,249 participants in France in 2018, nearly 40% of adults reported chronic low back pain [2].

Osteopaths are primary contact practitioners who mainly manage patients with musculoskeletal pain symptoms (62%), located for 42.6% in the spine and with 20% of patients reporting chronic pain [3].

Manual therapy is included as second-line non-pharmacological care in the French High Authority for Health (*Haute Autorité de Santé*) guidelines for the management of patients with non-specific low back pain [4]. This is consistent with several non-specific low back pain primary care management recent guidelines [5–8]. Manipulations could provide mild to moderate improvements in pain and function (with generally low to moderate-quality evidence)[9].

According to the French decrees relating to education in osteopathy [10]: “*The osteopath, in a systemic approach, following osteopathic diagnosis, carries out mobilisations and manipulations to manage the somatic dysfunctions of the human body [...]*”. In this definition, strong emphasis is put on the physical components of care and less on the behavioural, cognitive or emotional components of osteopathic care that are common to all health care professionals (HCP) [11, 12]. Considering the high number of pain presentations in osteopathic practice [3], it is therefore critical to ensure that osteopaths have efficient training in the neurophysiology and mechanisms of pain and don't hold harmful beliefs regarding cLBP. We therefore felt it was important

to assess the pain knowledge and the beliefs of our students and educators in order to take a baseline view.

Attitudes and beliefs concerning low back pain amongst musculoskeletal practitioners including osteopaths [13–16], chiropractors [17], physiotherapists [18, 19] and more broadly HCP [20] have often been studied constituting useful comparison literature for our model of education with other models. Previous studies on the attitudes and beliefs of osteopaths towards chronic low back pain (cLPB) in the UK [21] and Spain [22] have hypothesised that osteopaths would have a more biopsychosocial approach towards cLBP patients than other HCP. Moreover, patients seem to report stronger person-centeredness in complementary care than with conventional care [23]. However, results showed that osteopaths' attitudes and beliefs towards cLBP may be no different than those from other HCP [24, 25]. In addition, a modern conceptual approach regarding the neurophysiology of pain is essential in practitioners' skills to adequately explain pain experience of an individual [26–28]. The definition of pain has recently been revised to capture this [29]. A biomedical and mechanistic view of care cannot fully and holistically account for the totality of this experience. Pain education, including its biological, psychological and social dimensions, is a recent part of the French osteopathic curriculum [30]. Undergraduate pain education (Teaching Unit 2.15) amounts to just 20 hours, equating to 0.4% of total teaching time [30].

Practitioners' attitudes and beliefs can influence positive (placebo) or negative (nocebo) therapeutic outcomes in their patients [31], may influence their treatment approach [20] and could be detrimental to the recovery of cLBP patients when wrong messages are sent [32]. Beliefs about the body and pain are therefore considered to form key considerations in the treatment of pain-related disabilities [33].

The Fear Avoidance Beliefs Questionnaire (FABQ) is used to evaluate patients' beliefs about how physical activity and work affect their low back pain [34]. The FABQ-HC was designed as an adapted version of the FABQ for use with HCP [35]. The FABQ was translated into French in 2004 and its psychometric properties (test-retest reliability, construct validity and responsiveness) are acceptable [36].

The Neurophysiology Pain Questionnaire (NPQ) was developed to identify the barriers to reconceptualization of the clinical diagnosis of chronic pain based on the findings that patients have a poor knowledge and some difficulty understanding the neurophysiology of the pain [37]. The main goal of this test is to evaluate the patient's beliefs/conceptions of the pain mechanism. This has been reported as a crucial factor in the pain becoming chronic and could limit the efficacy of therapeutic interventions [37, 38]. The NPQ has been used in several educational studies to assess the understanding of health undergraduate students regarding pain neurophysiology [39–42].

Education in osteopathy is evolving towards university standards in France to promote high-quality education and clinical practice [43].

To our knowledge, no studies have specifically addressed the attitudes of French osteopathic educators towards cLBP patients. Their beliefs are crucial as they may impact both patients [20] and students' attitudes towards patients. Furthermore, final-year osteopathy students are a population that has often been studied concerning professional identity [44], impact of language they use on patients' beliefs [45], attitudes toward psychosocial risk factors [46], clinical assessment [47–49], and perceived preparedness [50, 51]. However, the beliefs of this specific population in a French OEI towards cLBP has to our knowledge never been evaluated. Our hypothesis

114 is therefore that Year 4 and Year 5 osteopathy students develop the same beliefs as
115 their educators.

116 The aim of this study was to evaluate the pain knowledge and the beliefs towards cLBP
117 of Year 4, Year 5 osteopathy students, and educators at the same French OEI towards
118 the management of cLBP patients via the FABQ-HC and the NPQ.

MATERIALS AND METHODS

Design

A cross-sectional quantitative questionnaire-based survey was conducted and reported following the STROBE statement [52] including two versions; one for the students and one for the educators. The survey differed between the two versions only by the sociodemographic part. The study protocol was approved by the XX Research Ethics Committee in June 2020 and met the requirements of the Declaration of Helsinki for research on human beings.

Study population

Year 4 (n=71) and Year 5 (n=65) osteopathy students of the XX OEI were invited to take part in the study. Information was given about this study during an introductory clinical practice course on the 31st of August 2020 for the Year 4 students and on the 14th of September 2020 for Year 5 students. The study was explained and proposed to all educators through the return to campus meeting on the 28th August 2020.

Inclusion criteria were being student in Year 4 or Year 5 or being educator in the osteopathy programme of the XX Institute. Exclusion criteria were not being an osteopath for the educators or those (educators and students) who didn't consent to participate. Out of the 36 educators who responded, one was involved in pain science teaching.

Measures and instruments

The French version of two validated questionnaires were used: the Fear Avoidance Beliefs Questionnaire for Health Care Practitioners (FABQ-HC) and the

Neurophysiology of Pain Questionnaire (NPQ) [34, 37]. The survey also included a sociodemographic section.

The sociodemographic questionnaire: for educators this recorded their age, gender, years of experience as practitioners and educators, whether they achieved a continuing professional development (CPD) course in the field of pain, and education undertaken other than osteopathy. For students, it only included age, gender and previous education before studying osteopathy.

The FABQ is used to evaluate patients' beliefs about how physical activity and work affect their low back pain [34]. The FABQ was translated into French in 2004 and its psychometric properties (test-retest reliability, construct validity and responsiveness) are acceptable [36]. The adapted version for HCP was used (FABQ-HC) [35]. Its adaptation was made by deleting the word "other" in the introduction of the questionnaire giving this instruction: "these are statements that (other) patients have expressed about their low back pain" [35]. It is a 16-item questionnaire, graded on a 7-point Likert scale (strongly disagree to strongly agree) with two sections. Items 1 to 5 assess beliefs about physical activity and items 6 to 16 assess beliefs about work.

A cut-off score corresponds to a score above 14 (out of 24) for the Physical Activity subscale and above 34 (out of 42) for the Work subscale [35]. Scores that exceed these values suggest important fear-avoidance beliefs for their relative subscale.

The NPQ was developed to identify the barriers to reconceptualization of the clinical diagnosis of chronic pain based on the findings that patients have a poor knowledge and some difficulty understanding the neurophysiology of the pain [37]. The main goal of this test is to evaluate the patient's beliefs/conceptions of the pain mechanism. This has been reported as a crucial factor in the pain becoming chronic

and could limit the efficacy of therapeutic interventions [37, 38]. It has also been used to assess neurophysiology of pain knowledge in physiotherapy students [53], osteopathy students [40], health care final-year students [54] and osteopaths [14]. A validated version of a 19-item questionnaire was proposed in French in 2015 [38]. The French version of the NPQ has been shown to be acceptable, valid, and with acceptable reliability in patients with chronic spinal pain [55].

Setting and data collection

This study was carried out at the XX Institute in August and September 2020. Educators received an email with a link to participate and to respond online (Google Forms) on their smartphone or laptop to the survey during the teachers' back-to-school meeting on the 26th August 2020. Students received a separate email to participate in the study during a clinical course scheduled on the 31st August for Year 4 osteopathy students and on the 12th September 2020 for Year 5 osteopathy students. Educators and students who completed the survey were deemed to consent to participate.

Statistical analysis

Raw data was exported from Google Forms into an Excel file (Microsoft Office 2016 for PC). Descriptive statistics for each participant for the 3 scores were calculated. Different tests were used to analyse our results. The "R" software (version 4.03 for PC) was used to run the statistical tests. For sample sizes greater than 30, we assumed that the distribution of the sample means was fairly normally distributed according to the central limit theorem. For supposed normal distributions, a p-value using the Fisher test was computed so as to assess the homoscedasticity.

In cases of normality and homoscedasticity, we calculated a 95 % confidence interval for the mean for each questionnaire. Furthermore, for comparison of means, a p-value was computed using the Z test (alpha set at $p < 0.05$) and the Cohen's d effect size was calculated.

In cases of non-normality or non-homoscedasticity, non-parametric statistics were used to evaluate differences. Thus, we calculated a 95% bootstrapped confidence interval for the mean (1 000 re-samples), and for median comparison, a p-value was computed using the Mann-Whitney test (alpha set at $p < 0.05$) and the Cliff's d effect size was calculated.

The FABQ-HC score from different previous studies was compared when applicable with the results from the present study by means of a one-way ANOVA test using summary data.

RESULTS

Participants

A total of 172 participants participated with 36 educators, 65 Year 5 students and 71 Year 4 students. Response rates were 80% (36/45) for educators, 94% for Year 5 students (65/69) and 97% (71/73) for Year 4 students. 59.3% of participants were female (102/172), the mean age was 22.4 ± 1.4 years for Year 4 students, 23.5 ± 1.5 years for Year 5 students and 35.9 ± 8.5 years for educators. Educators had a mean of 10.1 ± 6.4 years of experience as osteopaths and 6.8 ± 5.0 years of experience as educators. Details on sociodemographic characteristics for each group are provided in Table 1.

*** Insert Table 1 about here ***

Comparative score between sociodemographic groups on the two questionnaires

Results showed that Year 4 students have a significantly lower score ($p < 0.0116$; CI 95% [0.10 -3.08], $d = 0.36$) at the FABQ-HC Physical Activity than the Year 5 students (10.39 ± 3.93 vs 11.98 ± 4.80). However, there were no differences between these two groups for the FABQ-HC Work (24.90 ± 4.39 vs 23.54 ± 6.37) and the NPQ (11.94 ± 1.95 vs 12.31 ± 2.13).

No differences were found between Year 4 students and educators for FABQ-HC Physical Activity ($p > 0.05$, CI95% [1.70;1.97], $d = 0.03$), for the FABQ-HC Work ($p > 0.05$, CI95% [2.52;2.72], $d = 0.02$) and for the NPQ ($p > 0.05$, CI95% [0.47;1.19], $d = 0.18$).

Additionally, between Year 5 students and educators, results did not show differences for the FABQ-HC Physical Activity ($p = 0.30$, IC 95% [0.52;3.43], $d = 0.30$), for the FABQ-HC Work ($p = 0.35$, CI95% [1.60;4.13], $d = 0.19$) and for the NPQ ($p > 0.34$, CI95% [0.20;1.55], $d = 0.31$). All results are presented in Table 2.

*** Insert Table 2 about here ***

Impact of level of education, years of osteopathic experience and previous pain CPD on the two questionnaires

Significant differences were found between students' previous education level with the FABQ-HC Physical Activity ($p=0.0262$, $d=-0.27$): Year 4 students with a bachelor's degree had a significantly better score ($p < 0.0017$; CI95% [5.45-9.36], $d=0.58$) at the FABQ-HC Physical Activity (7.00 ± 3.57) than Year 5 students without a bachelor's degree (11.08 ± 3.70).

However, there were no differences for the two other questionnaires FABQ-HC Physical Work ($p=0.4483$; CI95% [23.09-26.82], $d=0.03$) and NPQ ($p=0.3409$; CI95%

[9.82-13.00], $d=-0.08$). Additionally, no significant differences were found in Year 5 students for any of the questionnaires.

A significantly better score was attained by educators who had less than 10 years of experience as osteopaths ($p<0.00001$, $d=0.01$) for the FABQ-HC Work (23.44 ± 7.63) versus educators who graduated more than 10 years ago (26.17 ± 6.64).

No significant differences were found between the mean scores of the years of experience as an educator or previous pain CPD for any of the three scores. All results are presented in the Table 3.

*** Insert Table 3 about here ***

*** Insert Table 4 about here ***

DISCUSSION

This study explored the pain knowledge and the fear-avoidance beliefs of undergraduate students and educators from one French OEI on the management of patients with cLBP. The primary findings of this study indicate that the educators and students shared similar beliefs about cLBP and have no significantly differing knowledge of pain.

Summary of findings and comparison to known literature

This is the first study to evaluate French osteopaths' pain knowledge and beliefs towards cLBP in educators and Year 4 and Year 5 osteopathy students and to compare students to their educators on the basis of two validated French-version at a single institution. This provides a useful basis to evaluate the curriculum, for offering an update of knowledge to educators, for assessing the students' skills acquisition in this area and overall for improving the level of education according to evidence-based data. Regarding the part of the FABQ that explores beliefs about exercise and low back pain, educators did not have statistically different scores to French rheumatologists [56] and

French general practitioners [35] as illustrated in table 4. This is a quite honourable result. It seems to show that osteopaths in our OEI (students and educators) do not have more deleterious beliefs than HCP who are among those who receive the most patients with musculoskeletal pain.

By comparison, regarding the FABQ-HC related to work-related beliefs, the educators scored lower than Spanish osteopaths [22] and French rheumatologists [56] and French general practitioners [35]. This result was unexpected and is hard to explain. However, we can hypothesise that osteopaths in France who are not fully HCP do not want to oppose a medical leave issued by a medical doctor. They may therefore tend not to favour a return to work if a general practitioner has indicated a work interruption. Educators who graduated as osteopaths less than 10 years ago showed significantly better results at the FABQ-HC Work (23.44 ± 7.63) than those who graduated more than 10 years ago (26.17 ± 6.64). Regarding these results, we did not find similar results specific to educators in the literature. However, this is consistent with previous studies that showed that osteopaths with less time as practitioners tend to have a more evidence-based attitude towards cLBP [21]. In France, the osteopathy programme has mainly evolved a lot during the past ten years in terms of quantity and quality. More newly trained osteopaths may have benefited from programmes that are more in line with current recommendations.

Regarding the NPQ score, French educators had higher pain knowledge score than Spanish health science students [41], but lower scores than Australian osteopaths [14]. In addition, educators who have undertaken specific CPD on pain do not appear to have different scores from those who have not whether on both FABQ-HC or NPQ. There is potential to improve pain education to optimise educators' knowledge in this field. The results did not show any significant differences in scores between students

and educators for the three questionnaires. It means that students who do rotations in the clinic (Year 4 and Year 5 students) and their educators share similar beliefs. Educators could therefore create these beliefs in students during the first three pre-clinical years. However, this remains hypothetical.

This result is more surprising from the point of view of the NPQ as we expected educators to have higher scores. It would be valuable to repeat this study in the future as the recent osteopathic curriculum changes put more emphasis on certain fundamental knowledge related to pain (allostasis, biopsychosocial model, interoception, enactivist approach to pain, predictive processing models of perception) that was not present before [30, 57].

Significant differences were found between students' previous level of education with the FABQ-HC Physical Activity: students with a bachelor's degree had a significantly better score at the FABQ-HC Physical Activity (9.60 ± 5.35) than students without a bachelor's degree (11.42 ± 4.23).

Year 4 students unexpectedly scored significantly higher than Year 5 students did on the FABQ-HC physical activity score. The implementation of the new evidence-based lectures over the last two years may be starting to bring positive changes. However, 20% of the Year 4 students had at least a Bachelor's degree on beginning the osteopathic curriculum. Previous education before studying osteopathy had the greatest impact on the FABQ physical activity score (these students have an average of 7.00 ± 3.57 versus 11.08 ± 3.70 for the rest of the class). Most of these came with a sports sciences background that could have had a positive effect on beliefs concerning physical activity. Moreover, 32% of Year 5 students scored above the cut-off on FABQ Physical Activity compared to 11% of Year 4 students.

The other scores did not differ between Year 4 and Year 5 students. The subscale score for the work part of the FABQ is significantly lower than for physiotherapy students [58] or for French rheumatologists [56] and French general practitioners [35]. There appears to be a possibility for improvement in the teaching of beliefs regarding low back pain and work as the scores of both students and educators appeared to be significantly higher than those found in the literature. All European cLBP guidelines deliver similar messages for the management of non-specific pain: keeping active, continuing or returning to work and avoiding bed rest [59]. This is consistent with a previous study that found that UK osteopathy students may have attitudes that are not aligned with European guidelines [60].

Applications for education and practice

One of the challenges of training adults is to find a way of facilitating the transition from academic learning to training for their future profession. It is essential to ensure that osteopaths adopt an appropriate attitude towards low back pain based on non-harmful beliefs to deliver appropriate treatment to their patients. Indeed, clinicians with positive attitudes are more likely to follow management guidelines. [61]. There was no effect on any score for the educators having taken CPD dedicated to pain. However, we had no information concerning what type of CPD had been completed, its content, or when it was completed. There is potential to improve pain education in osteopaths and future osteopathy curricula in France.

In addition, guidelines can sometimes be perceived as threats to professional identity [62, 63] by some osteopaths and particularly by some educators according to their own attitudes towards the osteopathic principles and their further application in clinical context [64].

To address these barriers requires some educational strategies to contribute meaningfully to the attitudes of future professionals with new models and theoretical frameworks for osteopathic care [65]. To shape a professional identity [66] as a person-centred living tradition of care [67] with specific strategies by the worldwide community of practice depends on whether osteopathy is regulated at an academic level [68] or not [69]. It must positively consider the rich diversity of practice and education as a piece of the puzzle [70], finding a way between osteopathic principles and evidence [57].

Study limitations

This study explored the knowledge and fear-avoidance beliefs towards cLBP of a single OEI; it did not represent the characteristics of the overall osteopathic population of students and educators in France. Moreover, no previous studies have explored these scores in other French OEIs; it is not possible to know if the results characterised an average score or not and if educators represented a specific population in terms of knowledge and beliefs. Assessing knowledge, perceptions, beliefs and attitudes to pain management and care among osteopathy students is essential to determine the effectiveness of current pain education. However, it is also a challenge as there is no gold standard instrument to assess these elements [71].

The FABQ-HC was developed in France [35, 56] with groups of rheumatologists and general practitioners, never used for French osteopaths and is not the most used instrument in the literature making comparisons difficult. The most widely-used questionnaires in the literature are the HC-PAIRS [72] and the PABS.PT [73] which are not yet translated, culturally adapted or validated in French.

Perspectives for research

Future research will assess attitudes, beliefs towards cLBP and pain knowledge in the same participants as part of a longitudinal study. The simple methodology developed in this study is easy to implement [74]. It will be used to assess the effectiveness and the impact of the training provided at the OEI. These first results constitute also a useful baseline comparison for future research. This can also be used as a simple tool to evaluate the impact of a future specific CPD on pain knowledge and beliefs towards cLBP on osteopaths.

CONCLUSION

This is the first study to explore the pain knowledge and the fear-avoidance beliefs towards cLBP of French osteopaths. This study supports the hypothesis that educators and students belonging to the same OEI share similar beliefs about cLBP and knowledge of pain. Previous education in sports science seems related to better scores concerning cLBP and physical activity for students whereas previous CPD had no effects on any score for the educators.

There is potential to improve pain education especially concerning the beliefs regarding cLBP concerning work. Future studies should focus on establishing strong methodologies to assess effectively osteopathy students' attitudes and beliefs allowing for feedback on the education provided. This could lay the foundations for a new generation of clinicians that will graduate with positive beliefs and attitudes towards pain and a background in best practices that should lead to better inter-professional cooperation for the benefit of chronic pain sufferers.

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| | Year 4 students | Year 5 students | Educators |
|---|-----------------|-----------------|------------|
| Number | 71 | 65 | 36 |
| Age - mean in years (SD) | 22.4 (1.4) | 23.5 (1.5) | 35.9 (8.5) |
| Gender women N (%) | 48 (68) | 45 (69) | 9 (25) |
| Education's grade equal or higher than a bachelor's degree for students N (%) | 12 (17) | 8 (12) | / |
| Years of experience as an osteopath mean (SD) | / | / | 10.1 (6.4) |
| Years of experience as an educator mean (SD) | / | / | 6.8 (5.0) |
| Previous pain CPD N (%) | / | / | 10 (27.8) |

Table 1 - Sociodemographic characteristics of the population evaluated

| | FABQ-HC PHYSICAL ACTIVITY | | FABQ-HC PHYSICAL WORK | | NPQ |
|------------------------------------|---------------------------|----------------------------|-----------------------|-------------------------------|----------------|
| Category | Mean (SD) | Cut-off score >14 % (N) | Mean (SD) | Cut-off score >34 % (N) | Mean (SD) |
| Year 4 students (N = 71) | 10.39 (3.93) | 11.26 (8) | 24.90 (4.39) | 1.41 (1) | 11.94 (1.95) |
| Year 5 students (N = 65) | 11.98 (4.80) | 32.31 (21) | 23.54 (6.37) | 3.08 (2) | 11.63 (2.19) |
| Educators (N = 36) | 10.53 (4.87) | 19.44 (7) | 24.81 (7.39) | 5.56 (2) | 12.31 (2.13) |
| TOTAL | 11.02 (4.44) | 20.93 (36) | 24.37 (5.78) | 2.91 (5) | 11.90 (2.05) |
| Year 4 students vs Year 5 students | | | | | |
| CI95% | [0.10 ; 3.08] | | [-0.49 ; 3.22] | | [-0.39 ; 1.02] |
| Unilateral Z-test (p-value) | p = 0.018 | | p = 0.075 | | p = 0.190 |
| Effect size (Cohen's d) | d = 0.36 | | d = 0.25 | | d = 0.15 |
| Year 4 students vs Educators | | | | | |
| CI95% | [-1.70 ; 1.97] | | [-2.52 ; 2.72] | | [-0.47 ; 1.19] |
| Unilateral Z-test (p-value) | p = 0.44 | | p = 0.47 | | p = 0.20 |
| Effect size (Cohen's d) | d = 0.03 | | d = 0.02 | | d = 0.18 |
| Year 5 students vs Educators | | | | | |
| CI95% | [-0.52; 3.43] | | [-1.60 ; 4.13] | | [-0.20 ; 1.55] |
| Unilateral Z-test (p-value) | p = 0.07 | | p = 0.19 | | p = 0.07 |
| Effect size (Cohen's d) | d = 0.30 | | d = 0.19 | | d = 0.31 |

Table 2 - Mean (SD) and Cut-off score of each questionnaires (FABQ-HC Activity, Work and NPQ) for the three groups (Year 4 students, Year 5 stu

idents and Educators) and comparison of scores between each groups (CI 95%, p-value and effect sizes were reported).

| | FABQ-HC PHYSICAL ACTIVITY | FABQ-HC PHYSICAL WORK | NPQ |
|---|---------------------------|-----------------------|-------------------|
| Education's grade equal or higher than a bachelor's degree (students only) | | | |
| Yes (N = 20) - Mean (SD) | 9.60 (5.35) | 24.75 (4.37) | 11.70 (2.44) |
| No (N = 116) - Mean (SD) | 11.42 (4.23) | 24.16 (5.61) | 11.81 (2.01) |
| Mean difference | 1.82 | -0.59 | 0.11 |
| Test Fisher (5 %) | homoscedasticity | homoscedasticity | homoscedasticity |
| Size effect : d Cliff | d = - 0.27 | d = 0.06 | d = -0.02 |
| CI (95%) (yes) | [7.10 ; 12.10] | [22.70 ; 26.80] | [10.56 ; 12.84] |
| CI (95%) Bootstrap (yes) | [7.45 ; 11.45] | [23.15 ; 26.40] | [10.90 ; 12.75] |
| CI (95%) (no) | [10.65 ; 12.19] | [23.14 ; 25.18] | [11.44 ; 12.18] |
| Mann-Whitney test (one tailed) | p = 0.0262 | p = 0.3264 | p = 0.4483 |
| Years of experience as an osteopath | | | |
| < 10 (N = 18) - Mean (SD) | 9.94 (4.87) | 23.44 (7.63) | 12.78 (1.93) |
| ≥ 10 (N = 18) - Mean (SD) | 11.11 (4.66) | 26.17 (6.64) | 11.83 (2.15) |
| Mean difference | 1.17 | 2.73 | -0.95 |
| Test Mann-Whitney (5%) | 0.07 | p < .00001 | p = 0.31 |
| Test Fisher (5 %) | homoscedasticity | homoscedasticity | homoscedasticity |
| CI (95%) Bootstrap (< 10) | [7.78 ; 13.33] | [20.11 ; 28.89] | [10.94 ; 12.67] |
| CI (95%) Bootstrap (≥ 10) | [7.72 ; 13.39] | [22.28 ; 28.56] | [11.22 ; 13.50] |
| Size effect : d Cliff | d = -0.02 | d = 0.01 | d = -0.03 |
| Years of experience as an educator | | | |
| < 10 (N = 25) - Mean (SD) | 9.88 (5.02) | 24.12 (7.96) | 12.28 (2.24) |
| ≥ 10 (N = 11) - Mean (SD) | 12.00 (3.82) | 26.36 (6.64) | 12.36 (2.16) |
| Mean difference | 2.12 | 2.24 | 0.08 |
| Test Mann-Whitney (5%) | p = 0.11 | p = 0.35 | p = 0.34 |
| Test Fisher (5 %) | homoscedasticity | homoscedasticity | homoscedasticity |
| CI (95%) Bootstrap (< 10) | [8.72 ; 12.40] | [21.48 ; 27.24] | [11.40 ; 12.96] |
| CI (95%) Bootstrap (≥ 10) | [9.45 ; 13.91] | [23.55 ; 29.45] | [11.27 ; 13.55] |
| Size effect : d Cliff | d = 0.25 | d = 0.03 | d = 0.01 |
| Previous pain CPD (educators only) | | | |
| Yes (N =10) - Mean (SD) | 10.50 (4.00) | 23.50 (7.54) | 12.40 (2.68) |
| No (N = 26) - Mean (SD) | 10.54 (5.38) | 25.31 (7.69) | 12.27 (2.05) |
| Mean difference | 0.04 | 1.81 | -0.13 |
| Test Fisher (5 %) | homoscedasticity | homoscedasticity | homoscedasticity |
| Size effect : d Cliff | d = 0.02 | d = -0.17 | d = 0.02 |
| CI (95%) Bootstrap (yes) | [8.30 ; 12.60] | [20.00 ; 27.80] | [11.00 ; 13.90] |
| CI (95%) Bootstrap (no) | [8.58 ; 12.42] | [22.38 ; 27.92] | [11.50 ; 13.00] |
| Mann-Whitney test (one tailed) | p = 0.4801 | p = 0.2236 | p = 0.4801 |

Table 3 - Impact of educational (bachelor degree) and professional determinants (years of osteopath, years of educators, CPD) on each measured scores (FABQ-HC Activities,Work and NPQ). N

Mean, SD and statistical analysis were reported.

| Questionnaires | Studies | Present study | Van Biesen (2020) | Kennedy (2014) | Kennedy (2014) | Domenech (2011) | Burnett (2009) | Burnett (2009) | Burnett (2009) | Coudeyre (2006) | Poiraudeau (2006) |
|---------------------------|-----------------------|---------------------------------|---|------------------|------------------|------------------------|------------------------|------------------------|------------------------|-----------------------|-------------------|
| FABQ-HC | Population | Osteopathy students + educators | Final-year osteopathy students + Osteopaths | Nursing students | Medical students | Physiotherapy students | Physiotherapy students | Physiotherapy students | Physiotherapy students | General practitioners | Rheumatologists |
| | Participants | 172 | 70 | 101 | 64 | 87 | 53 | 44 | 59 | 864 | 266 |
| | Country | France | Spain | Ireland | Ireland | Spain | Australia | Singapore | Taiwan | France | France |
| FABQ-HC Physical Activity | Mean Score (SD) | 11.02 (4.44) | 10.69 (5.4) | 12.52 (5.8) | 11.19 (5.3) | 14.3 (5.1) | 6.3 (5.1) | 11.1 (5.2) | 12.2 (4) | 9.6 (4.8) | 9.2 (4.4) |
| | p-value (effect size) | vs Educators | 0.4405 (0.04) | 0.0238 (0.37) | 0.2651 (0.13) | 0.000095 (0.76) | 0.000079 (0.85) | 0.3057 (0.11) | 0.0869 (0.37) | 0.1315 (0.19) | 0.0611 (0.29) |
| | p-value (effect size) | vs year 4 students | 0.3486 (0.07) | 0.0022 (0.43) | 0.1572 (0.17) | <0.00001 (0.86) | <0.00001 (0.90) | 0.2156 (0.16) | 0.0051 (0.46) | 0.055 (0.18) | 0.0139 (0.28) |
| | p-value (effect size) | vs year 5 students | 0.0733 (0.25) | 0.2583 (0.10) | 0.1876 (0.16) | 0.0023 (0.47) | <0.00001 (1.15) | 0.1877 (0.18) | 0.384 (0.05) | 0.00006 (0.50) | 0.00001 (0.60) |
| FABQ-HC Work | Mean Score (SD) | 24.37 (5.78) | 22.29 (7.35) | / | / | 20.2 (7.7) | / | / | / | 17.5 (6.7) | 16.7 (6.9) |
| | p-value (effect size) | vs Educators | 0.049 (0.34) | / | / | 0.0012 (0.61) | / | / | / | <0.00001 (1.04) | <0.00001 (1.13) |
| | p-value (effect size) | vs year 4 students | 0.0052 (0.43) | / | / | <0.00001 (0.75) | / | / | / | <0.00001 (1.31) | <0.00001 (1.42) |
| | p-value (effect size) | vs year 5 students | 0.1446 (0.18) | / | / | 0.0021 (0.47) | / | / | / | <0.00001 (0.92) | <0.00001 (1.03) |

Table 4 – FABQ-HC Physical activity and Work from previous studies. Mean score (SD) and p-value for each comparison study

Findings

- Educators and students belonging to the same OEI have no significantly different beliefs about cLBP and no significantly differing knowledge of pain.
- Educators and students show similar scores to other French HCPs and foreign osteopaths on the FABQ-HC Physical activity but they scored lower on the FABQ Work.
- There is potential to improve pain education and the French osteopathy curriculum in France especially concerning the beliefs around cLBP in relation to work.

Declaration of interests

☐ The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

☒ The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

JDR provides continuing professional development courses in France on the biopsychosocial model and as Head of CPD at UCO he provides CPDs to some French Osteopathic Educational Institutions. JE is an associate editor at IJOM and has had no role in review or decision making with respect to this manuscript.