Attitudes, skills, and use of evidence-based practice: A cross-sectional survey of Swedish osteopaths

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A B S T R A C T

Background: Evidence-based practice (EBP) is integral to the provision of ethical, safe and high-quality health care. While osteopathy is an established and registered health profession in many countries, it is a developing, unregistered health profession in Sweden. This study explored the perceptions, skills, use, barriers and enablers of EBP among Swedish osteopaths.

Methods: Osteopath members of the Swedish Osteopathic Association were invited by email to participate in an anonymous online survey - a Swedish-translated and pilot-tested version of the Evidence-Based Practice Attitude and Utilisation Survey. Data collection was conducted between January and March 2019.

Results: Thirty-one per cent (78/249) of invited osteopaths responded to the survey. Respondents were largely supportive of EBP and most agreed or strongly agreed that EBP assisted clinical decision-making (84.7%), improved quality of patient care (83.3%), and was necessary in the practice of osteopathy (80.8%). Respondents typically reported moderate to moderate-high levels of EBP skills, whereas their level of engagement in EBP activities was variable and infrequent. The main reported barrier for EBP uptake was lack of clinical evidence in osteopathy. Workplace access to the internet and free online databases, and the ability to download full-text journal articles, were considered very useful enablers of EBP.

Conclusions: The responding Swedish osteopaths appeared largely supportive of EBP, reported moderate to moderate-high levels of EBP skills but participated infrequently in EBP activities. Studies of interventions aimed at enhancing the skills and clinical use of EBP in osteopathy are warranted.

Implications for practice

- The responding Swedish osteopaths were largely supportive of evidence-based practice and most agreed or strongly agreed that evidence-based practice assisted clinical decision-making, improved the quality of patient care, and was necessary in osteopathic practice.
- A main challenge for clinical practice is having osteopaths engage in evidence-based practice activities.

- There is a need for innovative interventions to improve osteopaths' skills and use of evidence-based practice in order to advance osteopathic practice.

Background

There has been an increased focus on the implementation of healthcare research evidence into clinical practice over recent years. The use of current best evidence, together with clinical expertise and patient preference and values in decision-making, is referred to as evidence-based medicine, or more inclusively, evidence-based practice (EBP) [1]. The implementation of EBP is considered to be integral to the provision of ethical, safe and high-quality health care.

While EBP is embraced by many, a number of associated challenges have been identified such as difficulties in generalising research evidence to individual patients (particularly those with multi-morbidities), increasing volumes of evidence, and perceived inflexible rules of EBP [2]. It is now acknowledged that EBP should incorporate wider-ranging research methodologies along with greater appreciation for the role of clinical judgement and the patient perspective [2].

Despite calls for physical and manual therapies to adopt EBP, uptake has been inconsistent, particularly in osteopathy where it is not clear how EBP theory, skills and knowledge are operationalised in clinical practice [3–6]. For example, some UK osteopaths perceive research and EBP as threats to their practice style and professional identity [7]. These views may act as barriers to the implementation of evidence-based clinical guidelines for back pain [8]. Although recent studies show support for EBP among registered osteopaths in the UK and Australia, this work also reports varying skill levels and infrequent participation in EBP activities [9,10].

The nature, practice and professional status of osteopathy varies throughout the world with regards to levels of professionalization, regulation, clinical autonomy and educational standards [11–13]. In Sweden, osteopathy is a developing and unregistered profession. Most Swedish osteopaths are members of Svenska Osteopatförbundet (Swedish Osteopathic Association) [14], which as at January 2019, comprised 249 qualified osteopath members [15].

Currently, only one college offers osteopathic education in Sweden, the Scandinavian College of Osteopathy in Gothenburg. This private institution, which operates outside of the Swedish state-funded higher education system, offers a Bachelor level qualification validated by a higher education institution in Finland (Metropolia University of Applied Sciences in Helsinki) where osteopathy is a registered health profession [16]. The Scandinavian College of Osteopathy adheres to the European Committee for Standardisation for osteopathy [13], which was adopted in 2015 and standardises training, education and practice across Europe. The college is currently in the process of implementing an evidence-informed approach to clinical teaching in higher education [17]. Additionally, the Swedish Osteopathy Association is developing international collaborations and building research capacity within osteopathy [18,19].

Given that osteopathy is an emerging and unregistered profession in Sweden, it is important to better understand the attitudes and behaviours of Swedish osteopaths towards the provision of EBP. In response to this knowledge gap, this study explored the perceptions, skills, use, barriers and enablers of EBP among Swedish osteopaths. The specific aims were to determine (a) the perception of EBP, (b) the level of perceived skill in EBP, (c) the level of engagement in EBP activities, (d) the enablers of, and barriers to EBP uptake, and (e) the association between demographic factors and skill, perception and use of EBP, among Swedish osteopaths.

Methods

Design

Cross-sectional online survey.

Sample and setting

The sample comprised of osteopaths registered with the Swedish Osteopathic Association. The sample size required to achieve a 50% response distribution, 10% margin of error and 95% confidence interval for any individual item in the survey was 70. This was based on a target population of 249 osteopaths.

Measurement

We used the Evidence-Based practice Attitude and utilisation SurvEy (EBASE) to address the study objectives [20]. The original English EBASE instrument has demonstrated acceptable test-retest reliability (ICC = 0.578–0.986), good internal consistency (Cronbach's alpha = 0.84), and good construct and content validity (CVI = 0.899) [20,21]. The structure and development of EBASE is described in detail elsewhere [20]. Briefly, EBASE comprised 83 items, divided into seven sections, including (i) attitude toward EBP (Part A), (ii) level of skill in EBP (Part B), (iii) EBP training and education (Part C), (iv) EBP utilisation (Part D), (v) barriers to EBP uptake (Part E), (vi) enablers of EBP uptake (Part F), and (vii) participant demographic information (Part G). The survey is able to produce three EBP subscores, including a 'use subscore' (with values ranging from 0 [mainly infrequent use] to 24 [mainly frequent use]), skill subscore (with values ranging from 13 [primarily low-level skill] to 65 [primarily high-level skill]) and an 'attitude subscore' (with values ranging from 8 [predominantly strongly disagree] to 40 [predominantly strongly agree]). To date, EBASE has been administered to more than 8 health professions across 4 countries [9,10,22–27].

To ensure EBASE was suitable to administer to a Swedish population, we adapted a process that included forward translation of the survey from English into Swedish, an external translator contributing to backwards translation, cognitive interviewing with a survey developer, and pilot testing with respondents of various professions including osteopathy [28]. Given that EBASE was originally developed for an Australian complementary medicine (CAM) audience, some survey items required minor modification to ensure they were suitable for osteopaths based in Sweden. This included replacing the term 'CAM' with 'osteopathy', 'Australian States' with 'Counties of Sweden', and interventions usually provided in an initial CAM consultation to those more pertinent to Swedish osteopathic practice. Neither of these changes impacted the meaning of the items.

Recruitment and data collection

The Swedish Osteopathy Association distributed an email to their registered osteopath members (n = 249) in January 2019, inviting them to participate in the anonymous online survey. The survey was hosted by SUNET Artologik, a secure digital survey platform used in Swedish higher education [29]. The survey was open for two months (January 2019 to March 2019) during which the invited osteopaths received two reminders to participate in the survey (i.e. one and three weeks after the first invite).

Data analysis

Data were prepared using EBASE scoring guidelines (M Leach, pers. comm., 30 October 2019) and analysed using IBM® SPSS® Statistics 25.0 (Armonk, New York, IBM Corp). Skipped items were presented as missing data only, and were not replaced or imputed. Measures of

central tendency and variability were reported for normally distributed data. Data that were non-normally distributed, including EBASE subscores, were reported as medians and the interquartile range (IQR). Categorical data were presented as frequency distributions and percentages. To test for associations between ordinal-level variables (e.g. highest qualification, years in practice), we used Kendall's Tau correlation coefficient (T). Cramer's V was used to test relationships between nominal-level variables (e.g. clinical setting, geographical region). Coefficients were interpreted as follows: weak correlation (0.10–0.29), moderate correlation (0.30–0.49), and strong correlation (0.50–1.00) [57].

Results

Seventy-eight osteopaths responded to the survey, which represented a response rate of 31% (78/249).

Demographic characteristics

Most respondents were aged 30–49 years (61.6%), balanced in terms of gender mix and held a bachelor degree qualification or higher (58.9%), with over half (57.7%) obtaining this qualification within the past 5 years (Table 1). Almost two-thirds of osteopaths had been in clinical practice for ≤10 years (60.2%), with most (79.5%) working 16–45 h/week in this role, predominantly in solo practice (55.1%), in the city (80.8%), and within the counties of Västra Götaland (38.5%) and Stockholm (16.7%) (Table 1). Most osteopaths neither participated in research (79.5%) nor taught in the higher education sector (78.2%) (Table 1).

Attitude toward EBP

Most respondents supported EBP and agreed or strongly agreed that professional literature and research findings were useful in their daily practice (93.6%), and that EBP assisted them in care decisions (84.7%), improved the quality of patient care (83.3%), and was necessary in osteopathy practice (80.8%) (Table 2). Most (89.7%) also agreed or strongly agreed they were interested in learning or improving their skills to incorporate EBP into their practice (Table 2). More than half (58.9%) disagreed or strongly disagreed that EBP placed an unreasonable demand on their practice (Table 2).

The median attitude subscore (30, IQR 28,34; range 16–39) reflected a predominantly neutral to agree response in favour of EBP (as defined by scores ranging between 24.1 and 31.9). A moderate positive correlation was found between attitude subscore (categorised by quartiles) and hours per week participating in research (T = 0.322, p = 0.001) and hours per week teaching in higher education (T = 0.324, p = 0.005). No statistically significant associations were detected between attitude subscore and other demographic variables.

Skills in EBP

Respondents predominantly reported a moderate to moderate-high level of skill across 11 of 13 areas related to EBP (Table 3). Highest levels of perceived skill were reported in the areas of problem identification (i.e. identifying precise clinical questions [59.0% reporting a moderate-high to high level of skill in this area] and identifying knowledge gaps in practice [60.3%]), evidence acquisition (i.e. locating professional literature [56.4%] and online database searching [48.7%]) and evidence appraisal (i.e. critical appraisal of evidence [55.1%]) (Table 3). Lowest levels of perceived skill related to the area of evidence generation (i.e. conducting systematic reviews [71.8% reporting a low to moderate level of skill in this area] and conducting clinical research [88.5%]) (Table 3).

The median skill subscore (42, IQR 36,48; range 19–63) was indicative of a predominantly moderate to moderate-high skill-level in EBP

Table 1
Demographic characteristics of participants (n = 78).

Characteristic	Frequency n (%)
Age	
20–29 years	5 (6.4)
30–39 years	23 (29.5)
40–49 years	25 (32.1)
50–59 years	18 (23.1)
60+ years	6 (7.7)
Missing	1 (1.3)
Sex	
Female	38 (48.7)
Missing	1 (1.3)
Highest qualification	
High school certificate	4 (5.1)
Vocational Degree/Diploma	11 (14.1)
University or College Certificate/Diploma	14 (17.9)
Bachelor degree	26 (33.3)
Master/PhD/Doctorate degree	20 (25.6)
Other	2 (2.6)
Missing	1 (1.3)
Years since receiving highest qualification	
< 1 year	7 (9.0)
1–5 years	38 (48.7)
6–10 years	11 (14.1)
11–15 years	6 (7.7)
16+ years	15 (19.2)
Missing	1 (1.3)
Years practiced in the field of osteopathy	
<1 year	6 (7.7)
1–5 years	27 (34.6)
6–10 years	14 (17.9)
11–15 years	12 (15.4)
16+ years	18 (23.1)
Missing	1 (1.3)
Hours per week in clinical (osteopathic) practice	
0 h	1 (1.3)
1–15 h	10 (12.8)
16–30 h	37 (47.4)
31–45 h	25 (32.1)
46+ hours	3 (3.8)
Missing	2 (2.6)
Hours per week participating in research, *n (%)*	
0 h	62 (79.5)
1–15 h	14 (17.9)
16–30 h	0 (0.0)
31–45 h	1 (1.3)
46+ hours	0 (0.0)
Missing	1 (1.3)
Hours per week teaching higher education	
0 h	61 (78.2)
1–15 h	15 (19.2)
16–30 h	0 (0.0)
31–45 h	0 (0.0)
46+ hours	0 (0.0)
Missing	2 (2.60
Treatments/management typically provided in first osteopathic consultation	
Joint mobilisation	65 (83.3)
Home exercise and ADL advice or instruction	62 (79.5)
Health/lifestyle advice or instruction	61 (78.2)
Traction	60 (76.9)
Massage/soft-tissue mobilization	58 (74.4)
Exercise and physical activity advice or instruction	57 (73.1)
Joint manipulation (e.g. HVLA)	55 (70.5)
Referral to other healthcare provider	49 (62.8)
Stretching	49 (62.8)
Triggerpoint therapy	44 (56.4)
Ergonomic advice or instruction	44 (56.4)
Physical exercise/rehabilitation training	38 (48.7)
Referral to other health service	35 (44.9)
Dietary advice or instruction	31 (39.7)
Nutritional supplementation advice	21 (26.9)
Non-prescription pharmaceutical advice or instruction	20 (25.6)
Taping	15 (19.2)
Other	14 (17.9)

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Table 1 (*continued*)

Characteristic	Frequency n (%)
Heat/cold treatment	11 (14.1)
Acupuncture	11 (14.1)
Laser therapy	4 (5.1)
TENS	4 (5.1)
Ultrasound	3 (3.8)
Clinical setting in which osteopathy is predominantly practiced	
Solo practice	43 (55.1)
With a group of osteopaths	20 (25.6)
With CT & conventional providers	5 (6.4)
With a group of CT providers	4 (5.1)
With a group of conventional providers	3 (3.8)
Other	2 (2.6)
Missing	1 (1.3)
County of Sweden	
Västra Götaland county	30 (38.5)
Stockholm county	13 (16.7)
Skåne county	6 (7.7)
Other counties (Gotland, Gävleborg, Halland, Jämtland, Uppsala, Värmland, Västerbotten, Västernorrland, Örebro, Östergötland)	28 (35.9)
Missing	1 (1.3)
Geographical region	
City (Central business district)	63 (80.8)
Suburbs	8 (10.3)
Rural/remote region	6 (7.7)
Missing	1 (1.3)

ADL – Activities of daily living; CT – Complementary therapy; HVLA – high-velocity low amplitude; TENS – Transcutaneous electrical nerve stimulation. Percentages may not add up to 100.0 due to rounding.

(as defined by scores ranging between 39.1 and 51.9). A moderate positive correlation was observed between skill subscore (categorised by quartiles) and highest qualification (T = 0.327, p < 0.001). A weak positive correlation was found between skill subscore and hours per week participating in research (T = 0.248, p = 0.020). Associations between skill subscore and other demographic variables were not found to be statistically significant.

Utilisation of EBP

Participant engagement in EBP-related activities was variable, but mostly did not exceed 10 times a month (Table 4). The highest level of EBP utilisation related to the most frequent use of online search engines to search for practice-related literature or research, with 60.2% engaging in this activity 6 or more times in the past month (Table 4). Using professional literature or research findings to change clinical practice was the least frequently used activity, with 66.6% of participants involved in this activity no more than 5 times in the preceding month (Table 4).

The median use subscore (9, IQR 5,17; range 0–24) reflected a level of EBP use predominantly in the range of 1–10 times/month (as defined by scores ranging between 6.1 and 12.0). There was a weak positive correlation between use subscore (categorised by quartiles) and hours per week teaching in higher education (T = 0.269, p = 0.010), but not with any other demographic variable.

When osteopaths were asked to estimate the percentage of their practice that was based on clinical research evidence, 16.7% reported a very small proportion (1–25%), 26.9% a small proportion (26–50%), 38.5% a moderate proportion (51–75%), and 17.9% a large proportion (76–99%). None of the participants indicated that 100% of their practice was based on clinical research evidence.

Most (78.2%) respondents reported using published clinical evidence only a little or to a moderate extent to inform their clinical decision-making (Table 5). Instead, respondents tended to favour traditional knowledge, with 55.2% using this knowledge to inform their clinical decision-making a lot of the time or always (Table 5).

Training in EBP

Most respondents had undertaken some training in EBP (91%), critical thinking/critical analysis (89.7%), applying research evidence to clinical practice (83.3%), conducting clinical research (83.3%) and conducting systematic reviews (83.3%). Most participants (61.6%–68%) completed this training in the form of a course/module/component within their undergraduate program.

Barriers to and enablers of EBP uptake

From a list of 13 potential barriers to EBP uptake, lack of clinical evidence in osteopathy was the factor reported by most participants as being a moderate to major barrier to EBP uptake (52.6%). Factors largely considered as 'not a barrier' were lack of colleague support for EBP (60.3% of participants), lack of resources (56.4%), patient preference for a particular treatment (55.1%) and lack of interest in EBP

Table 2
Participant attitudes toward evidence-based practice (n = 78).

	1 Strongly Disagree *n (%)*	*2* Disagree *n (%)*	*3* Neutral *n (%)*	*4* Agree *n (%)*	*5* Strongly Agree *n (%)*	Median (IQR)
Professional literature (i.e. journals & textbooks) and research findings are useful in my day-to-day practice	0 (0.0)	1 (1.3)	4 (5.1)	34 (43.6)	**39 (50.0)**	5 (4,5)
EBP assists me in making decisions about patient care	1 (1.3)	4 (5.1)	7 (9.0)	**41 (52.6)**	25 (32.1)	4 (4,5)
I am interested in learning or improving the skills necessary to incorporate EBP into my practice	1 (1.3)	2 (2.6)	5 (6.4)	**37 (47.4)**	33 (42.3)	4 (4,5)
EBP is necessary in the practice of osteopathy	3 (3.8)	5 (6.4)	7 (9.0)	**34 (43.6)**	29 (37.2)	4 (4,5)
EBP improves the quality of my patient's care	4 (5.1)	3 (3.8)	6 (7.7)	**38 (48.7)**	27 (34.6)	4 (4,5)
EBP takes into account my clinical experience when making clinical decisions	3 (3.8)	7 (9.0)	18 (23.1)	**29 (37.2)**	21 (26.9)	4 (3,5)
Prioritizing EBP within osteopathic practice is fundamental to the advancement of the profession	4 (5.1)	8 (10.3)	13 (16.7)	**37 (47.4)**	16 (20.5)	4 (3,4)
EBP takes into account a patient's preference for treatment	9 (11.5)	13 (16.7)	11 (14.1)	**31 (39.7)**	14 (17.9)	4 (2,4)
There is a lack of evidence from clinical trials to support most of the treatments I use in my practice	7 (9.0)	**28 (35.9)**	20 (25.6)	21 (26.9)	2 (2.6)	3 (2,4)
The adoption of EBP places an unreasonable demand on my practice	14 (17.9)	**32 (41.0)**	19 (24.4)	8 (10.3)	5 (6.4)	2 (2,3)

EBP – Evidence-based practice; IQR – Interquartile range; main response in bold.

Table 3
Participant self-reported skills in evidence-based practice (n = 78).

	1 Low *n (%)*	*2* Low-moderate *n (%)*	*3* Moderate *n (%)*	*4* Moderate-high *n (%)*	*5* High *n (%)*	Median (IQR)
Identifying precise clinical questions	1 (1.3)	4 (5.1)	27 (34.6)	**38 (48.7)**	8 (10.3)	4 (3,4)
Identifying knowledge gaps in practice	0 (0.0)	1 (1.3)	30 (38.5)	**40 (51.3)**	7 (9.0)	4 (3,4)
Locating professional literature	0 (0.0)	11 (14.1)	23 (29.5)	**28 (35.9)**	16 (20.5)	4 (3,4)
Online database searching	5 (6.4)	13 (16.7)	**22 (28.2)**	20 (25.6)	18 (23.1)	3 (3,4)
Retrieving evidence	2 (2.6)	15 (19.2)	23 (29.5)	**29 (37.2)**	9 (11.5)	3 (3,4)
Critical appraisal of evidence	3 (3.8)	7 (9.0)	25 (32.1)	**32 (41.0)**	11 (14.1)	4 (3,4)
Synthesis of research evidence	2 (2.6)	14 (17.9)	**29 (37.2)**	**29 (37.2)**	4 (5.1)	3 (3,4)
Applying research evidence to patient cases	2 (2.6)	11 (14.1)	**36 (46.2)**	26 (33.3)	3 (3.8)	3 (3,4)
Sharing evidence with colleagues	5 (6.4)	22 (28.2)	**26 (33.3)**	19 (24.4)	6 (7.7)	3 (2,4)
Using findings from clinical research	4 (5.1)	13 (16.7)	**38 (48.7)**	21 (26.9)	2 (2.6)	3 (3,4)
Using findings from systematic reviews	4 (5.1)	19 (24.4)	**28 (35.9)**	25 (32.1)	2 (2.6)	3 (2,4)
Conducting systematic reviews	10 (12.8)	**23 (29.5)**	**23 (29.5)**	18 (23.1)	4 (5.1)	3 (2,4)
Conducting clinical research	23 (29.5)	**27 (34.6)**	19 (24.4)	8 (10.3)	1 (1.3)	2 (1,3)

IQR – Interquartile range; main response in bold.

(51.3%). Remaining factors were mostly rated as not a barrier or only a minor barrier, such as insufficient skills to critically appraise the literature (82.1%), insufficient skills to apply research findings to clinical practice (79.5%), lack of incentive to participate in EBP (76.9%), insufficient skills to interpret research (76.9%), lack of industry support for EBP (74.4%), lack of relevance to osteopathic practice (73.1%) and insufficient skills for locating research (73.1%).

Three of 10 listed factors were considered 'very useful' enablers of EBP uptake by the majority of participants, including access to the internet in the workplace (70.5%), ability to download full-text journal articles (55.1%) and access to free online databases in the workplace (55.1%). All other factors were reported by most to be moderately to very useful enablers of EBP uptake, including access to critically appraised topics relevant to osteopathy (69.3%), access to critical reviews of research evidence relevant to osteopathy (69.3%), access to online education materials related to EBP (64.1%), access to tools that assist critical appraisal of research evidence (64.1%), free access to online databases that require licence fees (62.8%), access to online tools that assist osteopaths to conduct their own critical appraisals of multiple research papers (59%) and access to research rating tools that facilitate critical appraisal of single research papers (55.2%).

Discussion

This is the first study to investigate the perceptions, skills and use of EBP among Swedish osteopaths. The respondents were generally supportive of EBP, reported moderate to moderate-high levels of EBP skills, and participated in EBP activities infrequently.

Strengths and limitations

The response rate was 31% (78/249), which exceeded the required sample size and was substantially higher than that reported in previous EBP studies in osteopathy in the UK and Australia [9,10]. The relatively young and developing nature of osteopathy in Sweden was reflected in the survey responses with almost two-thirds of respondents reporting being in clinical practice for less than ten years. This short time in clinical practice, and thus recency of degree completion, was possibly a factor contributing to the favourable attitudes toward EBP among survey respondents [58]. Most respondents (91%) had undertaken some EBP training, typically as part of undergraduate studies, suggesting a familiarity with the concept of EBP. The respondents' demographic characteristics were largely comparable to the characteristics of the osteopath members of the Swedish Osteopathy Association [15]. However, a higher proportion of survey respondents (58.9%) relative to members of the Swedish Osteopathic Association (36.6%) held a Bachelor degree or higher [15], which should be considered when interpreting the results.

Our study had several limitations. Although the survey was anonymous, different types of bias cannot be excluded, including selection bias (i.e. osteopaths already in favour of EBP might have been more eager to respond), recall bias (i.e. leading to overestimations in the use of different types of EBP practices), or cognitive bias (i.e. impacting attitudes and the level of perceived skill) [54]. Additionally, the Swedish-translated version of EBASE was not psychometrically tested (i.
e. did not confirm the test-retest reliability, internal consistency, and construct and content validity of the survey), which should be considered in the interpretation of findings. Further, although the response rate was higher than previous studies of EBP in osteopathy using EBASE, and key respondent characteristics were similar to the Swedish Osteopathic Association membership, our findings might not be generalizable to the larger Swedish osteopathic community because the majority of members did not respond to this survey.

Attitudes, skills and use of EBP

Respondents were supportive of EBP, with over 80% agreeing that EBP was necessary in osteopathic practice, assisted them in making clinical decisions, and improved the quality of patient care. Most respondents also reported interest in improving their skills incorporating EBP into practice. These positive perceptions of EBP corroborate previous study results involving osteopaths in the UK and Australia, of which more than 69% and 75% agreed with these statements, respectively [9,10]. Similar attitudes towards EBP have also been reported among other allied health practitioners including physiotherapists [30], occupational therapists [31], and chiropractors [22,23].

Interestingly, 57.6% of our sample agreed or strongly agreed that patient treatment preferences should be considered in EBP, which is higher than that reported among UK (33.6%) and Australian (36.1%) osteopaths [9,10]. Given that consideration of patient preferences is an integral element of the original definition of EBP [1], these findings suggest Swedish respondents may have a more informed understanding of EBP as it relates to patient-centred care than their international counterparts.

Respondents reported moderate to moderate-high levels of perceived skills in EBP, with highest skill levels relating to problem identification and evidence acquisition. The Swedish respondents, similar to Australian and UK osteopaths [9,10], perceived themselves as adequately skilled in the first two stages of the EBP process (i.e. ask and acquire). By contrast, the respondents reported lower skills in the ability to use findings from, and to conduct, systematic reviews. The latter findings are in line with reports of Australian and UK osteopaths [9,10], as well as US chiropractors [25].

Effectively utilising clinical research findings, especially in the form

Table 4
Participant use of evidence-based practice (i.e. number of times each activity was undertaken within the last month) (n = 78).

	0 0 times *n (%)*	*1* 1-5 times *n (%)*	*2* 6-10 times *n (%)*	*3* 11-15 times *n (%)*	*4* 16+ times *n (%)*	Median (IQR)
I have used professional literature or research findings to assist my clinical decision-making	6 (7.7)	**32 (41.0)**	8 (10.3)	12 (15.4)	20 (25.6)	2 (1,4)
I have used an online search engine to search for practice related literature or research	7 (9.0)	**24 (30.8)**	14 (17.9)	9 (11.5)	**24 (30.8)**	2 (1,4)
I have read/ reviewed professional literature (i.e. professional journals & textbooks) related to my practice	11 (14.1)	**32 (41.0)**	13 (16.7)	5 (6.4)	17 (21.8)	1 (1,3)
I have used an online database to search for practice related literature or research	16 (20.5)	**30 (38.5)**	10 (12.8)	7 (9.0)	15 (19.2)	1 (1,3)
I have read/ reviewed clinical research findings related to my practice	17 (21.8)	**29 (37.2)**	13 (16.7)	5 (6.4)	14 (17.9)	1 (1,2)
I have used professional literature or research findings to change my clinical practice	15 (19.2)	**37 (47.4)**	9 (11.5)	4 (5.1)	13 (16.7)	1 (1,2)
I have consulted a colleague or industry expert to assist my clinical decision-making	15 (19.2)	**34 (43.6)**	10 (12.8)	4 (5.1)	15 (19.2)	1 (1,2)
I have referred to magazines, layperson/self-help books, or non-government/ non-education institution websites to assist my clinical decision-making	15 (19.2)	**30 (38.5)**	16 (20.5)	3 (3.8)	14 (17.9)	1 (1,2)

IQR – Interquartile range; main response in bold.

of systematic reviews, is a problem shared by several health professions [32]. The Swedish respondents reported low levels of skill in conducting clinical research and systematic reviews, which seems logical as most were practising clinicians. While this finding may seem contradictory given that the majority (83.3%) of participants reported completing at least some training in these areas, most training was undertaken at an undergraduate level, which suggests that the training may have been inadequate in preparing participants to effectively undertake this activity. Given that the utilisation of evidence from clinical research and systematic reviews is fundamental to EBP, we suggest the need to invest in the development and evaluation of suitable educational initiatives that enhance osteopath knowledge and skills in evidence application, as has been the case in other health disciplines [59,60]. This would provide assurances to stakeholders that engage with osteopaths, such as educators, other health providers and policy makers, that osteopaths would be adequately equipped to engage in EBP, and to deliver best practice care.

Most respondents reported low levels of engagement in EBP activities over the previous month. According to theories of expertise development in musculoskeletal practice [33], it is possible that experienced osteopaths perceive their patient case load as 'familiar' and 'homogeneous' (e.g. common and uncomplicated non-specific back or neck pain), suggesting less inclination to critically examine and question their practice and engage in EBP activities regularly [34,35]. By holding onto such perceptions, osteopaths may fail to recognise the complexity of biopsychosocial practice, their own personal biases and the changing nature of knowledge and evidence. That said, the use of online search engines to search for practice-related literature or research was higher among Swedish participants (30.8%) than osteopaths in the UK (10.9%) and Australia (16.0%) [9,10], with almost two-thirds of the Swedish sample (60.2%) engaging in this activity at least six times in the previous month.

The respondent's reliance on traditional knowledge, textbooks, personal intuition and personal preference to inform clinical decisions accords with findings from previous studies of UK and Australian osteopaths [8–10]. By contrast, respondents rarely referred to published clinical or experimental/laboratory evidence for clinical decision-making. Hypothetically, the reliance on traditional knowledge over published clinical evidence could be partly attributed to the perceived lack of scientific evidence in the field of osteopathy. Arguably, this suggests that implementation of EBP (i.e. applying clinical evidence to clinical practice) may be dependent on multiple factors, not just skill level, given that respondents self-reported a moderate-high level of skill in EBP.

Barriers and enablers to EBP

Swedish respondents reported a lack of clinical evidence in osteopathy as a moderate to major barrier to EBP uptake; a factor that also has been reported as a main barrier by Australian and UK osteopaths [9,10]. Despite previous concerns regarding the lack of supporting evidence in osteopathy [36,37], emerging evidence supports the safety and effectiveness of treatments commonly used across manual therapy professions to improve function and decrease pain [38-41]. As such, the respondents' perceived lack of clinical evidence might additionally relate to other factors. For instance, low level skills in determining whether appropriate research methodologies have been employed in different studies, and in interpreting results and applying research findings to patients, may be factors of importance for appreciating clinical evidence and EBP [42]. Additionally, barriers to employing EBP may not only be due to a perceived lack of evidence but also selective evidence uptake, whereby osteopaths look for evidence that support their prior beliefs, and if evidence contradicts their beliefs, the evidence is dismissed. Thus, osteopaths might not yet have entirely integrated critical appraisal skills, scientific culture and a deep understanding of EBP to fully integrate it into their clinical practice.

The most useful enabler to EBP uptake, as reported by the Swedish

Table 5
Information sources used to inform clinical decision-making (n = 78).

Information source	Never used	Used a little	Used to a moderate extent	Used a lot	Always used	Missing	Median (IQR)
Traditional knowledge	2 (2.6)	6 (7.7)	25 (32.1)	**35 (44.9)**	8 (10.3)	2 (2.6)	4 (3,4)
Patient preference	3 (3.8)	16 (20.5)	**25 (32.1)**	21 (26.9)	13 (16.7)	0 (0.0)	3 (3,4)
Personal intuition	1 (1.3)	13 (16.7)	27 (34.6)	**29 (37.2)**	8 (10.3)	0 (0.0)	3 (3,4)
Personal preference	2 (2.6)	16 (20.5)	26 (33.3)	**28 (35.9)**	6 (7.7)	0 (0.0)	3 (3,4)
Textbooks	0 (0.0)	14 (17.9)	28 (35.9)	**30 (38.5)**	5 (6.4)	1 (1.3)	3 (3,4)
Fellow practitioners or experts	3 (3.8)	18 (23.1)	**32 (41.0)**	22 (28.2)	3 (3.8)	0 (0.0)	3 (2,4)
Trial and error	6 (7.7)	23 (29.5)	**32 (41.0)**	15 (19.2)	2 (2.6)	0 (0.0)	3 (2,3)
Published clinical evidence	1 (1.3)	**34 (43.6)**	27 (34.6)	14 (17.9)	2 (2.6)	0 (0.0)	3 (2,3)
Clinical practice guidelines	10 (12.8)	21 (26.9)	**37 (47.4)**	9 (11.5)	1 (1.3)	0 (0.0)	3 (2,3)
Experimental/laboratory evidence	**37 (47.4)**	25 (32.1)	12 (15.4)	4 (5.1)	0 (0.0)	0 (0.0)	2 (1,2)

IQR – Interquartile range; main response in bold.

respondents, was access to evidence. Given that access to online resources, including full text articles, may be limited in clinical practice settings, it may be challenging for osteopaths working outside academia to access such materials. That said, increasing numbers of full text articles are now available as open access through online search engines and free databases such as PubMed and the Cochrane Library.

Implications and future research

EBP and best practice (in Swedish *"vetenskap och beprövad erfarenhet"*) are essential to the provision of ethical, safe, and high-quality health care in the Swedish health care system [43–45]. Clinical practice guidelines support health professionals in making evidence-based decisions. Swedish osteopaths responding to our survey reported using clinical practice guidelines to support their evidence-based clinical decision-making to a moderate extent. Accordingly, the types of treatments/strategies most frequently reported by respondents (e.g. manual therapy and advice, instruction about exercise, physical activity and activities of daily living) aligned with clinical practice guideline recommendations for the treatment of back pain [46–50], which coincidently is a main reason for patients seeking osteopathic care [51–53].

Our findings further suggest that the concepts of EBP were familiar and valuable to respondents. This familiarity with EBP may help facilitate communication and collaboration between providers of osteopathy and registered providers in the Swedish health care system. However, since only one-third of members of the Swedish Osteopathic Association participated in the survey, it is uncertain to what extent the findings are generalizable to the larger Swedish osteopathic profession.

In light of our findings, studies of interventions aimed at enhancing the skills and clinical use of EBP in osteopathy are warranted. Given that barriers and facilitators to the uptake of EBP may be influenced by a variety of personal and professional values, workplace cultural norms and clinical contexts, there are likely to be variations in the way clinicians adopt EBP [61]. The use of mixed methods and qualitative research designs may thus deepen our understanding of the clinical competence and applicability of EBP in the osteopathic community. Soliciting conceptions and beliefs [62–64] about EBP from osteopaths that either strongly adhere to traditional/historical concepts and principles [65] or reject evidence-based clinical guidance [7,8] could inform strategic educational efforts to focus the promotion of EBP in order to support and strengthen clinical osteopathic practice. Collaborative research initiatives, facilitated by mutual efforts among professional, educational and academic stakeholders also may be relevant for osteopathy in Sweden and the Nordic countries. These initiatives have been successfully implemented in Australia and New Zealand, resulting in several joint academic and osteopathic professional body achievements, including the initiation of practice-based research networks in osteopathy and subsequent research publications [55,56].

Conclusions

This study provides important insights into the attitudes, skills and use of EBP among Swedish osteopaths. Responding osteopaths were largely supportive of EBP and most agreed or strongly agreed that EBP assisted clinical decision-making, improved the quality of patient care, and was necessary in osteopathic practice. Respondents typically reported moderate to moderate-high levels of EBP skill and infrequent levels of engagement in EBP-related activities. The most useful enablers of EBP uptake related to the accessibility of bibliographic resources, with the main barrier being a lack of clinical evidence in osteopathy. Future studies of interventions aimed at improving osteopaths' skills and use of EBP are warranted to not only advance osteopathic practice, but to potentially improve patient outcomes.

Ethics and informed consent to participate

The Regional ethics committee in Stockholm reviewed the study protocol and categorised the anonymous EBASE project as a quality assurance control (kvalitetssäkringskontroll) with the decision that ethical approval was not necessary.

Participants were provided with study information online including that participation in the study was voluntary, that participants had the right to withdraw from the study at any time without consequence, and that completion of the survey implied consent for the data to be used for research purposes. Survey data were non-identifiable and reported at group level in order to maintain participant anonymity.

Availability of data and material

The data analysed during the current study, in aggregated format to maintain anonymity, are available from the corresponding author upon reasonable request.

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Authors' contributions

ML conception and study design; statistical analysis; manuscript draft; critically reviewed and edited and approved the final manuscript.

RS: manuscript draft; critically reviewed and edited and approved the final manuscript.

PA: manuscript draft; critically reviewed and edited and approved the final manuscript.

GF: manuscript draft; critically reviewed and edited and approved the final manuscript.

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the final manuscript.

ES: manuscript draft; critically reviewed and edited and approved the final manuscript.

TS: conception and study design; project coordination; data collection; manuscript draft; critically reviewed and edited and approved the final manuscript.

Declaration of competing interest

We report competing interests as several authors are on the editorial board of the International Journal of Osteopathic Medicine. GF is an Associate Editor, OT is a member of the Editorial Committee and RS is a member of the International Advisory Board of this journal. RS is also programme director at the Scandinavian College of Osteopathy. However no authors had any role in the review or decision-making associated with this manuscript.

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