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The Italian Osteopathic Practitioners Estimates and RAtes (OPERA) study: how osteopaths work.

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Keywords:	osteopath; scope of practice; cross-sectional; osteopathic practice; OPERA; OPERA-IT
Abstract:	Introduction: The scope of practice of the osteopathic profession in Italy is underreported. The first part of the present study investigated the Italian osteopaths' profile, focusing on the socio-demographic information and geographical distribution together with the main characteristics of their education. The OPERA-IT study highlighted that the majority of respondents declared to work alone (58.4%), while the remaining declared to work in association with other professionals. Since teamwork and networking are recognized as fundamental aspects of healthcare , the present study aims to compare the osteopathic practise, diagnostic, and treatment modalities of osteopaths who work alone and osteopaths who work associated to other healthcare professionals to highlight possible differences. Moreover, patients' characteristics will be presented. Methods: The OPERA-IT study population was chosen to provide a representative sample. A web campaign was set up to inform the Italian osteopathic professionals before the beginning of the study. The OPERA IT study used a validated questionnaire. The questionnaire was translated into Italian following the WHO recommendation. The questionnaire was composed of 57 items grouped in five sections, namely: socio-demographics, osteopathic education, and training, working profile, organisation, and management of the clinical practice and patient profile. The survey was delivered online through a dedicated platform. Results: 4,816 individuals completed the survey. Osteopaths who work alone represented the majority of the sample (n=2814; 58.4%). Osteopaths who work with other professionals declared to collaborate mostly with physiotherapists (n=1121; 23.3%), physicians with speciality (n=1040; 21.6%), and other osteopaths (n=943; 19.6%). The two groups showed heterogeneous characteristics. Significative differences were observed in all the factors, namely: geographical distribution, age, gender, training, working contract and working place, patient per day and time for each patient, fees, and the average waiting period to book an appointment. The principal component analysis supported a ten-component model and explained 80.5% of the total variance. The analysis showed that osteopaths working alone have an increased probability (OR = 0.91; CI 95%: 0.88 - 0.94; p<0.01) of using systemic diagnostic and treatment techniques and have distinct clinical features with higher probability (OR =0.92; 0.88 - 0.96; p<0.01) of spending less time with patients, being paid less but treating a higher number of patients per week. The most represented patients' age groups were 41-64 years old (n=4452; 92.4%) and 21-40 years old (n=4291; 89.1%). Similarly, the most reported new patients age groups were 41-64 years old (n=4221; 87.7%) and 21-40 years old (n=3364; 69.9%). The most common presenting complaints were back pain, cervical pain, cervicobrachialgia, sciatica, shoulder pain, and headaches. Conclusions: Osteopathic practice in Italy seems to be characterised by interprofessional collaboration, mostly with physiotherapists. Our results highlighted two different profiles in terms of sociodemographic characteristics and work modalities between osteopaths who work alone and those who work associated with other professionals. Although according to the respondents, people of all ages consult Italian

	osteopaths, the majority of patients are adults. Most of them have been referred to osteopathy by other patients or acquaintances. Patients seek osteopathic care mostly for musculoskeletal related complaints.
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- Give the name of the institutional review board or ethics committee that approved the study
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The data underlying the results presented in the study are available from (include the name of the third party and contact information or URL). • This text is appropriate if the data are owned by a third party and authors do not have permission to share the data.	
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1 **The Italian Osteopathic Practitioners Estimates and RAtes (OPERA) study: how**

2 **osteopaths work.**

3

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25

26   **Abstract**

27   **Introduction:** The scope of practice of the osteopathic profession in Italy is underreported.

28   The first part of the present study investigated the Italian osteopaths' profile, focusing on the

29   socio-demographic information and geographical distribution together with the main

30   characteristics of their education. The OPERA-IT study highlighted that the majority of

31   respondents declared to work alone (58.4%), while the remaining declared to work in

32   association with other professionals. Since teamwork and networking are recognized as

33   fundamental aspects of healthcare, the present study aims to compare the osteopathic practise,

34   diagnostic, and treatment modalities of osteopaths who work alone and osteopaths who work

35   associated to other healthcare professionals to highlight possible differences. Moreover,

36   patients' characteristics will be presented.

37   **Methods:** The OPERA-IT study population was chosen to provide a representative sample.

38   A web campaign was set up to inform the Italian osteopathic professionals before the

39   beginning of the study. The OPERA IT study used a validated questionnaire. The

40   questionnaire was translated into Italian following the WHO recommendation. The

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42   demographics, osteopathic education, and training, working profile, organisation, and

43   management of the clinical practice and patient profile. The survey was delivered online

44   through a dedicated platform.

45   **Results:** 4,816 individuals completed the survey. Osteopaths who work alone represented the

46   majority of the sample (n=2814; 58.4%). Osteopaths who work with other professionals

47   declared to collaborate mostly with physiotherapists (n=1121; 23.3%), physicians with

48   speciality (n=1040; 21.6%), and other osteopaths (n=943; 19.6%). The two groups showed

49   heterogeneous characteristics. Significative differences were observed in all the factors,

50   namely: geographical distribution, age, gender, training, working contract and working place,

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Conclusions: Osteopathic practice in Italy seems to be characterised by interprofessional collaboration, mostly with physiotherapists. Our results highlighted two different profiles in terms of sociodemographic characteristics and work modalities between osteopaths who work alone and those who work associated with other professionals. Although according to the respondents, people of all ages consult Italian osteopaths, the majority of patients are adults. Most of them have been referred to osteopathy by other patients or acquaintances. Patients seek osteopathic care mostly for musculoskeletal related complaints.

Introduction

Osteopathy is a growing health profession in Italy. In a recent national opinion survey conducted on a sample of 800 participants by Eumetra Monterosa (1), it has been reported that over 10 million Italians received osteopathic care, particularly for musculoskeletal related problems (70% of the reported reasons of the consultation). 90% of the sample in the

study ~~declared to be~~ satisfied with the osteopathic care provided (1). The first part of the present study investigated the Italian osteopaths' profile, focusing on the socio-demographic information and geographical distribution together with the main characteristics of their education (2). The scope of practice of the osteopathic profession in Italy is, however, significantly underreported. Therefore, other health care professionals and the general public may not be aware of the nature of the osteopathic practice, including commonly treated clinical conditions, therapeutic interventions, and patients' characteristics. This is particularly important because the osteopathic care provided may vary amongst individual clinicians and between countries (3–9). For example, American osteopathic physicians have a scope of practice equivalent to medical practitioners (10). In Europe, Denmark, Finland, France, Iceland, Italy, Liechtenstein, Malta, Portugal, Switzerland, Turkey, and the UK have regulated osteopathy (11). In contrast to their US counterparts - i.e., 'osteopathic physicians', European osteopaths have limited practice rights, and they are called 'osteopaths' (10). In Italy, with the approval of the law 3/2018, osteopathy has been recognized as a healthcare profession (12). However, the regulation process is still ongoing, and despite the recent publication of the Core Competence of the Italian Osteopaths (13), the proper scope of practice of Italian osteopaths has not yet been published.

Van Dun et al. (6) were the first authors to profile ~~the~~ osteopathic practitioners in countries without statutory regulation in osteopathy using the Benelux Osteosurvey tool. The Osteopathic Practitioners Estimates and RAtes (OPERA) project was developed starting from the Osteosurvey tool. OPERA is a European-based census aimed to profile the osteopathic profession across Europe (2). Arguably, it is a relevant tool for all the stakeholders interested in obtaining up-to-date and reliable information regarding the geo-distribution, prevalence, incidence, and profile of osteopaths and their patients in Europe. The OPERA study has been initially conducted in Italy (2) and is currently being carried out in Spain, Andorra, Belgium,

4

Luxembourg, and Portugal. Several studies investigated the primary reasons for consultation and the characteristics of patients receiving osteopathic care (5,8,14–20). However, none of these studies was carried out on the Italian population.

The aim of the OPERA Italy (OPERA-IT) study was to profile osteopathic practice in Italy by surveying osteopaths across the country regarding socio-demographic information (2), their practice and patients' characteristics, presenting symptoms and clinical problems, use of diagnostic and treatment modalities. The OPERA-IT study highlighted that the majority of respondents declared to work alone (58.4%), while the remaining declared to work in association with other professionals. Since teamwork and networking are recognized as fundamental aspects of healthcare (21), the present study aims to compare the osteopathic practise, diagnostic, and treatment modalities of osteopaths who work alone and osteopaths who work associated to other healthcare professionals to highlight possible differences. Moreover, patients' characteristics will be presented.

Methods

The SUrvey Reporting GuidelinE (SURGE) (22) was used as a reporting guideline for this article.

Population

The OPERA-IT study population was chosen to provide a representative sample. For that purpose, the recruitment strategy followed specific criteria and was as inclusive as possible without compromising the representativeness of the sample. Hence the recruitment was aimed to obtain the highest possible participation among those who fulfilled the following inclusion criteria: older than 18 years old, the successful completion of any training leading to a Diploma in Osteopathy (DO) or equivalent (23), and the participants had to be practising

124 as an osteopath. Participation or successful completion of any training courses on single

125 techniques and osteopathic approaches, which did not lead to a DO or equivalent title (23),

126 was not considered sufficient to be included in the study. Therefore individuals matching this

127 profile were excluded. Exclusion criteria were set to prevent non-osteopaths who attended

128 short and non-degree/professional awarding courses in, e.g., craniosacral technique or spinal

129 manipulation to participate and to lower the representativeness of the sample. OPERA-IT

130 used an online survey; therefore professionals with no access to the online platform were

131 excluded. Individuals who could not understand and respond in Italian and individuals with

132 physical or mental impairments that precluded participation in the online survey were also

133 excluded. Participants were requested to read and understand all the information about the

134 study and to give their informed consent by starting the survey as clearly stated in the survey

135 presentation page. The study received the approval of the Institutional Review Board of the

136 Foundation COME Collaboration (12/2016).

137

138 **Recruitment**

139 A website for promoting OPERA IT was created. A web campaign was set up to inform the

140 Italian osteopathic professionals before the beginning of the study. The campaign was

141 structured as a combined social media and newsletter strategy. The largest osteopathic

142 national voluntary registering body (ROI) took part in the promotion by sending a newsletter

143 to all its current members. At the time in which the study was carried out, ROI included

144 approximately 2,500 members. Since it was estimated that the ROI members alone were not

145 representative of the Italian osteopaths population, an additional e-campaign was established

146 to reach the osteopathic education institutions, the other voluntary registering bodies and

147 professional associations and the known osteopathic internet providers/specialised websites

148 (i.e., tuttosteopatia.it) asking them to advertise the study to all of their members through the

149 official OPERA IT e-flyer. In addition to the e-flyer, all the participating osteopathic

150 education institutions were provided with a physical flyer and other advertising material to be

151 displayed at their location. Furthermore, a manual based search on white-pages was

152 conducted to identify other sources of information. The promotion strategy was carried in

153 twelve steps. Each step consisted of the dispatch of the e-flyer to all the different mailing

154 lists. The time interval for the promotion strategy, recruitment, and data collection were five-

155 months. All participants, upon the completion of the survey, received an invitation containing

156 the credential to attend free continuous professional development (CPD) webinars on a

157 dedicated online platform. Participants were able to log in at any time during the study period

158 and follow the pre-recorded webinars

159

160 **Survey tool**

161 The OPERA IT study used a validated questionnaire (6). The questionnaire was translated

162 into Italian following the WHO recommendation. Therefore, a forward-backwards translation

163 was performed by two bilingual English-Italian translators with experience in the field of

164 demographic health research. The questionnaire is composed of 57 items grouped in five

165 sections, namely: socio-demographics, osteopathic education, and training, working profile,

166 organisation, and management of the clinical practice and patient profile. A pilot survey was

167 delivered to twenty Italian-speaking osteopaths. The pilot aimed to gather information about

168 the degree of comprehensibility of the items. For that purpose face-to-face interviews were

169 conducted by the research team and the survey was modified in accordance with the

170 suggestions of the participants. The first OPERA IT publication reported the results of the

171 first three sections of the survey (2). The present study will report the results from the

172 remaining two sections.

173

174 The OPERA survey online platform, the symmetric keys data encryption, and the certified

175 data centre were the same used for the first part of the present study (2). Therefore, all of the

176 gathered information was processed and hosted following data protection regulations, the

177 answers were anonymised, and the IP addresses were not accessible to the research team. The

178 system automatically managed the link between the StudyID and the email address of

179 respondents so that double response was not allowed. Only OPERA research personnel had

180 access to the complete, anonymised dataset.

181

182 **Privacy**

183 The anonymity and privacy of data were respected following the European directive

184 2002/58/CE of the European Parliament. Gathered data will be stored for 5 years to allow

185 benchmarking and further analyses.

186 ~~Information guidelines~~

187 ~~In this study will be reported participants answers regarding their practice and patients'~~

188 ~~characteristics, presenting symptoms and clinical problems, use of diagnostic and treatment~~

189 ~~modalities~~

190 **Statistical analysis**

191 Data were analysed using mean, median, mode, point estimates, range, standard deviation,

192 and 95% confidence interval. For dichotomous measures, relative risk was used. Statistical

193 analyses were based on a univariate and multivariate approach. R statistical programme (v.

194 3.1.3) was used to perform statistical analysis. A value of alpha less than 0.05 was considered

195 as significant.

196

197 **Principal-Component Analysis** (PCA) and logistic analysis

198 The examination of the data indicated that items had non-normal distributions, which is

199 common for categorical data. Categorical PCA, a form of PCA specifically geared to discrete

200 ordinal values, was run using R Statistical program (v3.5). The fundamental idea of PCA is to

201 examine the matrix of item correlations to reduce the information into a smaller set of

202 components. These components can form the basis for hypotheses about latent factors. In the

203 presence of high intercorrelation, items are assumed to be measuring the same latent

204 component. All items are assumed to load onto all components.

205 Component eigenvalues represent the relative share of total variance accounted for by that

206 component and can, therefore, be used to select the number of components. We selected

207 components being greater than 1, in order to determine the dimensions underlying the pattern

208 of interrelationships among the scores considered. Thus, reducing the number of the original

209 variables and increasing the interpretability of the summary components. To aid

210 interpretability, the component matrix was rotated using Promax oblique rotation, which

211 assumes that components are correlated. Rotations are a change in the coordinate of the

212 component solution that makes the pattern of loadings more pronounced and, therefore

213 clearer. Components loadings, which are the correlation coefficients between the items and

214 the identified components, are reported. The square of component loadings represents the

215 amount of variance in the item explained by the component.

216 The resulting components of PCA were used as independent variables in a logistic regression

217 model with the dependent variable "alone" yes/no. The interpretation of the meaning of each

218 factor was defined in a collaborative way among the authors. In general, all items were

219 categorised into (1) musculoskeletal; (2) systemic; (3) clinical. Each category was

220 characterized by a number of affine elements (clusters). The systemic category included both

221 diagnostic items, as the visceral, cranium, and fascial diagnostic techniques, and treatment

222 items, as neurovisceral and neurolymphatic reflex techniques and fascial techniques. The

223 musculoskeletal category included as well both diagnostic and treatment items, as palpation

224 of the position of the anatomical structures, and trigger points treatment. The "clinical"

225 category was characterized by items which describe the clinical practice of the osteopathic

226 professional, such as the duration and the fees of the first and follow-up clinical encounters,

227 the average waiting period to schedule an appointment or the number of patient per week

228 encountered by the practitioner.

229

230 **Results**

231 4,816 individuals completed the survey. 196 questionnaires, corresponding to a 4% attrition

232 rate, were left uncompleted. Composition and geographical distribution of the whole sample

233 are reported by Cerritelli et al. (2). Osteopaths who work alone represented the majority of

234 the sample (n=2814; 58.4%). Osteopaths who work with other professionals declared to

235 collaborate mostly with physiotherapists (n=1121; 23.3%), physicians with speciality

236 (n=1040; 21.6%), and other osteopaths (n=943; 19.6%). A comprehensive description of

237 osteopaths' collaborations is available in Table 1.

238

	N	%
Alone	2814	58.4
Associated	2002	41.6
osteopath	943	19.6
GP	390	8.1
physiotherapist	1121	23.3
occupational therapist	74	1.5
psychologist	746	15.5
speech therapist	317	6.6
dietician	671	13.9
dentistry	433	9.0
massage therapist	446	9.3
physician with specialty	1040	21.6
optometrist	162	3.4

other	493	10.2

Table 1. Working collaborations of osteopaths

Comparison between osteopaths who work alone and associated

The two groups showed heterogeneous characteristics. ~~Significative~~ differences were observed in all the factors, namely: geographical distribution, age, gender, training, working contract and working place, patient per day and time for each patient, fees, and the average waiting period to book an appointment. In particular, referring to the geographical distribution, osteopaths who work in the macro-region "centre" have the highest odd to work associated with other professionals (OR = 1.37). Younger osteopaths (20-29 years old) have the highest odd to work associated compared to other age groups (OR of other age groups compared to the 20-29 age group < 1). Female osteopaths have 59% more likely to work associated compared to male ones (OR = 1.59). Osteopaths who graduated through a full-time curriculum (T1) have a higher chance of working associated compared to those from a part-time one (T2) (OR for T2 compared to T1 = 0.71). Osteopaths who work as self-employed in their clinic have the highest probability of working in association with other professionals (OR. 1.23). Osteopaths who work in a university have a 77% increased probability of working associated than osteopaths who work in other places (OR = 1.77). Osteopaths who have 11 to 15 clinical encounters per day are more likely to work in association than others (OR = 1.50) as well those whose clinical encounter lasts 46-60 minutes (OR = 2.). Osteopaths who charge between 51 and 60 euros per both first consultation and follow-ups have more than the double probability to work in association than others (OR = 2.37; OR = 2.94). Osteopaths who have a waiting period for the booking in between 2 and 3 weeks have almost a probability almost three times higher to work in association compared to the others (OR = 2.93). Extensive data about the comparison between the characteristics of the two groups are available in table 2.

Variable	Alone (%)	Associated (%)	p	OR (Alo/Ass)*
Geographical distribution				
North-west	883 (31.4)	610 (30.5)		0.90 (0.77 – 1.05)
North-east	714 (25.4)	442 (22.1)	<0.001	0.90 (0.77 – 1.05)
Centre	618 (21.9)	586 (29.2)		1.37 (1.18 – 1.60)
South	503 (17.9)	310 (15.5)		0.89 (0.75 – 1.06)
Islands	96 (3.4)	54 (2.7)		0.81 (0.54 – 1.15)
Age				
20-29	527 (18.7)	518 (25.9)		
30-39	1083 (38.5)	845 (42.2)		0.79 (0.68 – 0.92)
40-49	699 (24.8)	420 (21.0)	<0.001	0.61 (0.52 – 0.73)
50-59	395 (14.0)	201 (10.0)		0.52 (0.42 – 0.64)
60-65	94 (3.4)	18 (0.9)		0.19 (0.12 – 0.33)
>65	16 (0.6)	0 (0.0)		NA
Gender				
Male	1999 (71.0)	1215 (60.7)	<0.001	
Female	815 (29.0)	787 (39.3)		1.59 (1.41 – 1.79)
Training				
T1	851 (30.2)	758 (37.9)	<0.001	
T2	1963 (69.8)	1244 (62.1)		0.71 (0.63 – 0.80)
Work				
DO employed	31 (1.1)	34 (1.7)	<0.001	
DO self-employed in own clinic	2511 (89.2)	1600 (79.9)		0.58 (0.36 – 0.95)
DO self-employed not in own clinic	272 (9.7)	368 (18.4)		1.23 (0.74 – 2.06)
Working Place				
Private practice	2510 (92.1)	1547 (77.3)	<0.001	
Clinic/hospital	482 (17.1)	510 (25.5)	<0.001	1.72 (1.49 – 1.97)
Osteopathy School	557 (19.8)	495 (24.7)	<0.001	1.44 (1.26 – 1.65)
University	79 (2.8)	86 (4.3)	0.005	1.77 (1.29 – 2.41)
Other	374 (13.3)	356 (17.8)	<0.001	1.54 (1.32 – 1.81)
Patients/day				
0-5	1396 (49.6)	867 (43.3)		
6-10	1142 (40.6)	909 (45.4)	<0.001	1.28 (1.13 – 1.45)
11-15	225 (8.0)	210 (10.5)		1.50 (1.22 – 1.85)
16-20	39 (1.4)	10 (0.5)		0.41 (0.21 – 0.83)
>20	12 (0.4)	6 (0.3)		0.81 (0.30 – 2.15)
Time/patient				
<30 minutes	57 (2.0)	23 (1.2)		
30-45 minutes	484 (17.2)	331 (16.5)	<0.001	1.69 (1.02 – 2.81)
46-60 minutes	1651 (58.8)	1338 (66.8)		2.01 (1.23 – 3.28)
>60 minutes	622 (22.1)	310 (15.5)		1.24 (0.75 – 2.04)
Fee first consultation				
<25 euros	27 (1.0)	11 (0.6)		
26-30 euros	73 (2.6)	23 (1.2)		0.77 (0.33 – 1.80)
31-40 euros	198 (7.0)	103 (5.2)		1.28 (0.61 – 2.68)
41-50 euros	907 (32.2)	574 (28.6)		1.55 (0.76 – 3.16)
51-60 euros	671 (23.8)	648 (32.4)	<0.001	2.37 (1.17 – 4.82)
61-70 euros	405 (14.4)	352 (17.5)		2.13 (1.04 – 4.36)
71-80 euros	285 (10.1)	163 (8.1)		1.40 (0.68 – 2.90)
81-90 euros	113 (4.1)	61 (3.1)		1.33 (0.62 – 2.85)
91-100 euros	77 (2.7)	39 (1.9)		1.24 (0.56 – 2.77)
>100 euros	58 (2.1)	28 (1.4)		1.18 (0.51 – 2.73)
Fee following consultations				
<25 euros	43 (1.5)	12 (0.60)		
26-30 euros	100 (3.5)	50 (2.50)		1.79 (0.87 – 3.70)
31-40 euros	340 (12.1)	229 (11.4)		2.41 (1.25 – 4.68)
41-50 euros	944 (33.6)	673 (33.6)		2.55 (1.34 – 4.88)
51-60 euros	676 (24.0)	555 (27.8)	<0.001	2.94 (1.54 – 5.63)
61-70 euros	370 (13.2)	292 (14.6)		2.83 (1.46 – 5.46)
71-80 euros	184 (6.6)	125 (6.3)		2.43 (1.23 – 4.80)
81-90 euros	59 (2.0)	38 (1.9)		2.31 (1.08 – 4.93)
91-100 euros	75 (2.7)	28 (1.4)		1.34 (0.62 – 2.90)
>100 euros	23 (0.8)	0 (0.00)		NA
Average waiting period				
Same day	69 (2.5)	20 (1.00)		
Within 1 week	1559 (55.4)	1136 (56.7)		2.51 (1.52 – 4.16)
1 week < X ≤ 2 weeks	827 (29.4)	612 (30.6)	<0.001	2.55 (1.54 – 4.25)
2 weeks < X ≤ 3 weeks	126 (4.5)	107 (5.3)		2.93 (1.67 – 5.13)
3 weeks < X ≤ 4 weeks	97 (3.4)	62 (3.1)		2.21 (1.22 – 3.98)
> 4 weeks	136 (4.8)	65 (3.3)		1.65 (0.92 – 2.94)

264 Table 2. characteristics of the two groups (*alone* vs *associated*).

265 *OR is computed for the probability of working alone using the first value of each variable as the exposure factor.

266

PCA and logistic analysis

268 The principal component analysis supported a ten-component model (Table 3), based on

269 eigenvalues included between 6.8 (PC-1) to 1.1 (PC-10). This model explained 80.5% of the

270 total variance and appeared interpretable and therefore was retained. Components emerging

271 from the analysis included all items referred to the 3 categories. Few items have found to

272 have loading values below -0.40, whereas a distinct number of items had values above 0.30

273 or below -0.30. Collectively items that correlated the most were those related to the category

274 clinical, i.e. time to patient and fees.

275 Following the PCA, the ten-components model was loaded into a logistic regression in order

276 to identify those components that associated significantly with the Alone/Associated

277 dependent variable.

278 As shown in Table 4, the logistic analysis demonstrated that only seven factors were

279 significantly related to being "alone". This result means that those components that resulted

280 significantly associated include items characterising the difference between being "alone or

281 associated" in practice. Among those, there is clear evidence that osteopaths working alone

282 have an increased probability (OR = 0.91; CI 95%: 0.88 - 0.94; p<0.01) of using systemic

283 diagnostic and treatment techniques (see PC-3 items in Table 3) and have distinct clinical

284 features with higher probability (OR =0.92; 0.88 - 0.96; p<0.01) of spending less time with

285 patients, being paid less but treating a higher number of patients per week (see PC-6 items in

286 Table 3).

	PC1	PC2	PC3	PC4	PC5	PC6	PC7	PC8	PC9	PC10
Region	0.00	-0.03	**0.28**	**-0.20**	-0.08	**-0.41**	0.16	**-0.35**	0.01	**0.30**
Gender	0.00	-0.07	**0.28**	-0.01	0.06	-0.13	**0.24**	-0.09	0.14	**-0.29**
Age	0.07	**0.30**	-0.19	-0.13	-0.12	-0.07	0.01	**0.30**	0.07	-0.04
Training_type	-0.03	**-0.23**	0.13	0.07	0.12	-0.12	**0.22**	**-0.56**	-0.08	-0.03
Time for new patient	0.01	-0.11	**0.24**	0.11	**0.20**	**-0.44**	0.05	**0.22**	0.02	**0.24**
Time for returning patient	0.03	-0.08	**0.26**	0.08	**0.20**	**-0.40**	0.02	**0.25**	0.07	**0.29**
Fee first consultation	-0.02	**0.30**	-0.14	**-0.25**	0.12	**-0.35**	**0.20**	-0.06	-0.11	**-0.22**
Fee following consultation	0.00	**0.29**	-0.12	**-0.31**	0.16	**-0.34**	0.16	-0.03	-0.10	**-0.24**
Average waiting period	0.01	**0.24**	-0.10	-0.16	0.12	0.07	**0.24**	-0.05	0.17	**0.46**
N patients per working week	-0.02	**0.25**	-0.18	**-0.20**	0.06	**0.23**	**0.21**	-0.11	0.07	**0.32**

	PC1	PC2	PC3	PC4	PC5	PC6	PC7	PC8	PC9	PC10
Diagnostic techniques - assessment of visceral mobility	-0.16	0.11	**0.27**	**-0.23**	-0.05	-0.04	**-0.28**	-0.14	0.11	0.04
Diagnostic techniques - assessment of the cranium (neuro- and viscerocranium)	-0.04	**0.21**	**0.35**	-0.04	0.10	0.03	-0.17	-0.01	-0.02	-0.05
Diagnostic techniques - fascial testing	-0.11	0.17	**0.28**	**-0.20**	-0.09	0.15	-0.02	0.10	0.13	-0.04
Diagnostic techniques - inspection	-0.12	0.10	-0.05	0.02	0.04	-0.02	**-0.38**	-0.06	**-0.23**	**0.21**
Diagnostic techniques - muscle function testing	-0.16	0.18	-0.07	**0.29**	0.07	-0.01	-0.08	-0.13	-0.10	0.03
Diagnostic techniques - neurolymphatic reflex tests	**-0.20**	-0.08	-0.04	**-0.24**	0.04	0.02	-0.11	0.03	**-0.24**	-0.08
Diagnostic techniques - palpation of position/structures	-0.05	0.14	0.09	**0.20**	**0.23**	0.13	0.11	**0.20**	**-0.38**	-0.04
Diagnostic techniques - palpation of movement	-0.19	0.13	-0.06	0.17	0.01	-0.12	**-0.23**	0.04	0.16	0.03
Diagnostic techniques - percussion and auscultation	**-0.24**	-0.13	-0.11	0.05	-0.10	-0.04	0.17	0.13	**0.26**	-0.09
Diagnostic techniques - tender points and trigger points	**-0.24**	-0.12	-0.11	-0.07	**0.39**	0.11	-0.07	0.04	0.17	0.00
Diagnostic techniques - classic orthopedic tests	**-0.24**	-0.06	-0.12	-0.05	**0.39**	0.04	-0.09	0.02	0.18	0.00
Diagnostic techniques - classic neurologic tests	**-0.26**	-0.12	-0.12	0.02	**0.23**	0.10	0.00	0.11	0.10	-0.06
Diagnostic techniques - Range Of Motion (ROM)	**-0.20**	-0.14	-0.04	-0.06	**0.30**	0.13	0.00	0.06	-0.09	-0.01
Diagnostic techniques - Otoscopy	-0.09	0.18	-0.13	**0.23**	0.00	-0.12	-0.13	**-0.20**	0.13	-0.16
Diagnostic techniques - urine test	-0.05	0.13	-0.13	0.12	0.04	-0.13	**-0.22**	-0.16	**0.38**	-0.19
Treatment techniques - automatic shifting and fluid body approach	0.03	**0.28**	0.18	**0.22**	**0.22**	0.16	0.16	-0.02	-0.04	0.02
Treatment techniques - fascial techniques	-0.17	0.07	**0.27**	-0.04	-0.08	**0.25**	0.17	-0.01	0.12	-0.08
Treatment techniques - fluid techniques	-0.17	0.13	0.11	0.15	-0.03	0.17	**0.21**	0.15	0.06	-0.04
Treatment techniques - functional techniques	-0.15	0.09	0.18	0.04	0.08	0.06	0.14	-0.08	-0.08	-0.16
Treatment techniques - GOT/TBA	**-0.23**	-0.07	-0.04	-0.02	-0.12	0.01	0.09	0.03	**-0.27**	-0.08
Treatment techniques - HVLA	**-0.23**	-0.10	-0.13	-0.17	-0.07	-0.06	-0.03	-0.09	**-0.27**	0.09
Treatment techniques - MET	**-0.22**	-0.12	-0.04	-0.05	-0.10	-0.10	-0.02	**0.22**	-0.15	-0.10
Treatment techniques - neurocranial and viscerocranial techniques	-0.16	0.12	**0.22**	-0.02	-0.07	0.00	-0.08	-0.01	-0.11	-0.03
Treatment techniques - neurovisceral and neurolymphatic reflex techniques	-0.17	**0.20**	-0.04	**0.33**	-0.13	-0.04	0.02	-0.03	-0.10	-0.06
Treatment techniques - percussion and vibration techniques	-0.18	0.15	0.00	0.12	**-0.22**	-0.09	-0.05	**0.21**	0.01	0.06
Treatment techniques - trigger points	**-0.23**	-0.13	-0.08	0.02	**-0.22**	-0.07	**0.27**	0.09	**0.21**	-0.04
Treatment techniques - Progressive Inhibition of Neuromuscular Structures (PINS)	**-0.20**	0.05	-0.05	0.16	-0.12	-0.14	0.16	0.00	-0.09	0.16
Treatment techniques - soft and connective tissue techniques	**-0.21**	-0.09	0.10	-0.12	-0.18	-0.06	0.12	-0.02	0.01	0.18
Treatment techniques - visceral manipulations	**-0.20**	0.01	**0.22**	**-0.25**	-0.16	-0.06	-0.16	-0.15	0.08	0.10
Treatment techniques - toggle-techniques	-0.16	0.03	-0.08	0.12	-0.10	-0.13	0.13	**-0.33**	-0.04	**0.29**

Factor loadings above 0.20 (positive or negative) are in bold
Table 3. Principal-Component Analysis results

Coefficients	Estimated	Std. Error	z value	Pr(>|z|)	OR	95% CI
(intercept)	0.35	0.03	11.84	**<0.01**	1.42	1.34 - 1.51
PC1	0.07	0.01	6.39	**<0.01**	1.08	1.05 - 1.10
PC2	0.01	0.02	0.98	0.33	1.02	0.99 - 1.05
PC3	-0.10	0.02	-5.72	**<0.01**	0.91	0.88 - 0.94
PC4	0.03	0.02	1.22	0.22	1.03	0.98 - 1.07
PC5	-0.03	0.02	-1.24	0.21	0.97	0.93 - 1.02
PC6	-0.09	0.02	-3.51	**<0.01**	0.92	0.88 - 0.96
PC7	-0.12	0.03	-4.60	**<0.01**	0.89	0.84 - 0.93
PC8	0.13	0.03	4.91	**<0.01**	1.14	1.08 - 1.21
PC9	0.07	0.03	2.47	**0.01**	1.07	1.02 - 1.14
PC10	0.09	0.03	2.97	**<0.01**	1.09	1.03 - 1.16

Table 4. Logistic Analysis of the principal components

Patients characteristics

293   The most represented age groups treated within a six months period prior to the census were

294   41-64 years old (n=4452; 92.4%) and 21-40 years old (n=4291; 89.1%). Similarly, the most

295   reported new patients age groups were 41-64 years old (n=4221; 87.7%) and 21-40 years old

296   (n=3364; 69.9%). Respondents reported that the majority of their patients were self-referred,

297   whether this was based on advice from other patients or acquaintances. The most common

298   body regions requiring osteopathic care were the cervical and lumbar spine. The most

299   common presenting complaints were back pain, cervical pain, cervicobrachialgia, sciatica,

300   shoulder pain, and headaches. The majority of respondents indicated to have no preference of

301   specific patients groups to work with (e.g., paediatrics, athletes, artists) (n=4106; 85.26%).

302

303   **Discussion**

304   The variables studied are part of the OPERA questionnaire, which evaluates the

305   characteristics of the osteopathic population in a representative national sample. After an

306   initial evaluation of their distribution (2), the scores were modulated with a statistical analysis

307   procedure, in order to further identify the profile of the osteopathic practitioner with peculiar

308   characteristics (components), which allowed better defining the profiles of the studied

309   population.

310   The OPERA-IT was the first national census relevant to osteopathy in Italy. Data provided

311   by the participants might represent critical new findings relating to osteopathic practice and

312   patients characteristics that have not been observed through other national healthcare data

313   sets (e.g. *Istituto Nazionale di Statistica, Istituto Superiore di Sanità).* The results of this

314   study provide a comparison between the osteopathic professionals who work alone and those

315   who work in association with other professionals to highlight possible differences in terms of

316   geographical distribution, age, gender, type of training, working place and modalities,

317   patients per day, time of the treatment, fees, and average waiting period for booking an

appointment. Moreover, it describes patients' characteristics in terms of age, referring modalities. Our results highlighted two different profiles between osteopaths who work alone and those who work associated with other professionals. The former have an increased probability of the 8% (PC-1; $p < 0.01$) to not deliver musculoskeletal related diagnostic and treatment techniques, in particular, tender and trigger points assessment, orthopaedic tests, neurologic tests, range of motion tests, General Osteopathic Treatment (GOT), High Velocity and Low Amplitude techniques (HVLA), Muscle Energy Techniques (MET) (table 3). Moreover, osteopaths who work alone are 9% more likely (PC-3; $p < 0.01$) to perform systemic diagnostic and treatment techniques such as the assessment of visceral mobility, cranium assessment, fascial testing, and cranial and visceral manipulations (table 3). Osteopaths who work in association with other professionals have a higher probability (PC-6; 8%; $p < 0.01$) to have a short duration of the treatment and low treatment fees and to have more average patients per week (table 3).

Emerging evidence on the added value of effective interprofessional healthcare teams has created new perspectives on interprofessional collaboration (24–26).

The interprofessional practice has been described as a process that can affect three domains in healthcare; namely, enhancing patient experience with treatment, improving population health and decreasing healthcare costs per capita (27).

Capacity shortages, an ageing population with numerous chronic conditions and new scientific discoveries, require the cooperation of both clinicians and non-clinical members of the healthcare team (28,29).

Contemporary healthcare strategies accept interprofessional practice as an irremissible method to address complex issues. While interprofessional cooperation is beneficial to both practitioners and patients (30), it is still not fully in place (31). Whitehead (32) identified several advantages in applying interprofessional practice for the management of complex

conditions. The author argued that interprofessional practice creates an environment in which the group exceeds the parts' number; common goals are set, and everyone is working towards common goals; the chance to discuss with peers highlights the strengths and weaknesses of the working group through the exchange of experiences and knowledge. This helps break down distrust walls and reduces rivalry. Hierarchies become flatter and more accessible. Moreover, various professional experiences offer the possibility of innovative and creative activities and to identify gaps in practice; partnerships and partnerships result in a more productive way to distribute and use resources effectively; patients can see a more positive, focused and coordinated approach to their health needs and have more faith in it. Finally, there is a higher likelihood of more intensive and holistic approach, which is particularly relevant to the osteopathic practice. Whitehead (32) also highlighted different disadvantages of not engaging in interprofessional practice. The author stated that lone practitioners often act in an individualistic way. This means that weaknesses and mistakes are not solved, and probably they are perpetuated, there is no acknowledgement of good practice, and there are no opportunities to enhance practice. Environments are competitive in a destructive way, the hierarchies are strict, and the position of power is held through manipulative and aggressive behaviour. Perspectives and attitudes are kept isolated and limited. This suppresses the dissemination of information and ideas, fostering a practitioner centred practice. In lone practice, professional groups are protective, guarded, and mistrustful, and this may lead to professional disputes (33). The competitive climate fosters fights for resources. This might lead to a less efficient and less successful practice (32). Moreover, the author argues that in lone practice, there is a greater likelihood of clinical, reductionist, and mechanistic treatment being provided, particularly in terms of health services.

367 Our findings confirmed a well-established trend among other relevant surveys (5,6,8,15–

368 17,19) showing that primary reasons for osteopathic consultation are musculoskeletal

369 disorders mostly related to the spine.

370 In general, although the scope of practice of osteopathic profession might be influenced by

371 the regulation status, professional profile, and cultural factors related to the country, our study

372 found several similarities with the other European and international surveys. Our findings

373 supported some of the already known trends about the scope of practice of osteopathy,

374 helping to strengthen what might start to be considered an international shared descriptive

375 framework of the profession.

376 Results from OPERA-IT might help to define the profile of osteopathic professionals through

377 the perspective of Italian osteopaths. This could be of use in supporting the regulation process

378 providing materials for constructive and informed discussions with policymakers and other

379 stakeholders. Current data might be used to tailor regulatory strategies based on policy

380 outcomes. Moreover, professional associations and registers may benefit from present study

381 data in terms of understanding of the working modalities of their associates and to monitor

382 the national trends of the primary reasons for the osteopathic consultation. Lastly, there are

383 advantages for osteopathic practitioners: to be able to tailor their continuous professional

384 development to the needings of the Italian population and to assess their practice is up to date

385 with the current trend of the profession on the national ground.

386

387 **Strengths and weaknesses of this study**

388 To the best of our knowledge, this study is the first to highlight the differences between the

389 clinical profile of osteopathic practitioners who work alone and those who work in

390 association with other professionals in Italy. However, this study showed estimates that might

391 not be completely representative of the osteopathic Italian population. Moreover, self-

392 reporting data might be influenced by response bias. Furthermore, data reported is from a

393 nation-wide survey and thus might not be generalisable to other socio-cultural contexts.

394

395 **Conclusions**

396 Osteopathic practice in Italy seems to be characterised by interprofessional collaboration,

397 mostly with physiotherapists. Our results highlighted two different profiles in terms of

398 sociodemographic characteristics and work modalities between osteopaths who work alone

399 and those who work associated with other professionals. Although according to the

400 respondents, people of all ages consult Italian osteopaths, the majority of patients are adults.

401 Most of them have been referred to osteopathy by other patients or acquaintances. Patients

402 seek osteopathic care mostly for musculoskeletal related complaints.

403 The findings of the present study provide valuable insights into the osteopathic profession in

404 Italy, which might be taken into consideration during the regulation process about the

405 professional profile of competencies of the osteopathic profession in Italy. Follow-up studies

406 have been planned to track future changes within the osteopathic profession.

407

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419

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