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International Journal of Nursing and Midwifery

ARTICLES

Full Length Research Paper

Who is responsible for couple infertility: A clinic-based survey in Ouagadougou (Burkina Faso)

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This study was carried out to describe the male or female original causes of infertility among couples and the semen quality among men attending fertility clinics. A descriptive cross-sectional study was conducted with a retrospective data collection from 2003 to 2012. From 14 to 18th January, 6 982 patients were included and analyzed 6642 patients' data from 15 private and public medical centres in Ouagadougou, Burkina Faso. The mean age was 36.4 (95% CI: 35.3, 37.6), 30.0 (95% CI: 29.6, 30.4) and 29.6 (95% CI: 29.4, 29.8) for men, infertile and fertile women, respectively. The origin of the infertility was related to female or male factor in 25.1 and 7.7% of the cases, respectively while unexplained infertility represented 62.5% of the cases. The trend of the male infertility had a slight but steady increase over the last years of the study. Regarding semen quality, the male-factor infertility was more associated with the sperm quality (morphology, motility and vitality) than the spermatozoa count or the volume. Our findings tended to confirm that male infertility is increasing. Prospective studies are needed to investigate the specificities of infertility in Burkina Faso as well as the different partners' contribution to this.

Key words: Infertility, semen quality, prevalence, sub-Sahara Africa, Burkina Faso.

INTRODUCTION

Infertility is a clinical, psychological and social issue challenging couples and health professionals. Globally, 10 to 15% of couples would be facing this problem in their lifetime (Skakkebaek et al., 1994; Kliesch, 2014; Meacham et al., 2007). There are regional and country variability regarding the magnitude of the problem (Agarwal et al., 2015). Rates in sub Saharan Africa (SSA) range between 12.7 and 16.9% with a midpoint of 14.9% (Ericksen and Brunette, 1996; Agarwal et al., 2015). With respect to the etiology, 30 to 50% of the couple infertility are due to female factors and 20 to 40% related to male factors, 20 to 40% relate to both male and female factors

and up to 20% remained unexplained (Velez de la Calle et al., 2001; Sohrabvand et al., 2015; Nwajiaku et al., 2012). Among the different causes of infertility, male infertility is a complex challenge for health professionals because of the difficulty to have an accurate diagnosis (Agarwal et al., 2015; Skakkebaek et al., 1994; Irvine, 1998). Globally, accurate information on the magnitude of male infertility is lacking (Agarwal et al., 2015). Male infertility is not well reported because men are often reluctant to medical visits. Besides, cultural and social representations of infertility most often give clearance to men regarding the responsibility of the infertility inside couple to blame the female partner (Sciarra, 1994; Nwajiaku et al., 2012). However, a study by Carlsen et al. (1992) concluded to a reduction in male semen quality over a 50-year period (Carlsen et al., 1992). This finding triggered many other researches on male infertility and male reproductive health in general. The results are controversial regarding the hypothesis of increase in the prevalence of couple or male infertility (Agarwal et al., 2015).In Africa, the prevalence is between 2.5 and 6.3% with differences according to the regions and the lab procedures to analyze semen (Agarwal et al., 2015). Though controversial, some authors believe that secondary infertility is more prevalent in SSA (Ericksen and Brunette, 1996; Cissé et al., 2002; PATH, 1997). Female genital tract, specifically tubo-ovarian infections are the main causes of infertility in couples in SSA (Ericksen and Brunette, 1996; Collet et al., 1998; Audu et al., 2009; Sciarra, 1994). However, it has been indicated that the trend would be reversing in favor of male infertility fueled by environmental pollution and some modern lifestyle (Multigner and Oliva, 2001).

In Burkina Faso, the prevalence of infertility among couples is between 16.6 and 17.2% (Ericksen and Brunette, 1996). Pollution is rampant in Ouagadougou the capital city (Lindén, 2011, 2009 Linden et al., 2007), due to a mixture of smoke and dust from the use of motorcycle and old cars with defective engines driving incomplete fuel combustion, many open air commercial charcoal barbecue and the traffic on dirty roads. This environmental pollution could contribute to a change in the couple infertility epidemiology, leading to more contribution of the male factor. Because it is well established worldwide that environmental pollution causes many male infertility cases (Jurewicz et al., 2009; Selevan et al., 2000; Hansen et al., 2010). There is a paucity of data on male infertility in Burkina Faso. Our study aimed to investigate the male or female origin of couple infertilities and the semen quality among infertile men visiting fertility clinics in Ouagadougou (Burkina Faso).

MATERIALS AND METHODS

Study design, sites and population

It was a cross-sectional and descriptive study with retrospective census of data from clinics' registries and patients' files. Fourteen private and five public fertility clinics were identified as the study sites, because of their technical ability to manage infertility cases. All couples with the woman aged 18 to 49 and the men of 18 to 60, attending the clinics, were included whatever the reason of the visit, except those coming for ante natal visit. Also excluded are couples with a known human-induced cause of sterility such as vasectomy, tubal ligation or road or other accident complicated with impotence. An infertile couple were defined as a couple that failed to conceive a child after at least 12 months of regular unprotected sexual intercourses (Larsen et al., 1999; Larsen, 2005, 2000). This is the operational definition practitioners used countrywide. On the contrary, a fertile couple is a couple that is naturally capable to produce offspring (https://en.wikipedia.org/wiki/Fertility).

Data management and analysis

Field investigators were trained for the use of the data collection logs for one week including pre-test period. Then, they were distributed at a ratio of one by site except large clinics like the Gynecology Department of the University Teaching Hospital in Ouagadougaou and the private clinic "Notre Dame de la Paix) that received four and three investigators, respectively. Data were collected by the field investigators from patients' medical files and the clinics' registries. They were cross-checked by the field coordinator, coded and computerized by data entry team including study coordinator, resident medical students and data entry operators.

Descriptive univariate analysis was conducted. Frequencies of patients' clinical and demographic characteristics were calculated. To calculate the prevalence of couple's infertility, we use the operational definition that is also the WHO's clinical definition: "one year of regular unprotected intercourse without pregnancy" (Larsen, 2000, 2005; Larsen et al., 1999).

The denominator was all women visiting the clinic whatever the reason and the numerator was, the women who have been seeking child unsuccessfully after at least a one-year period of regular unprotected intercourses. Further, we presented the proportion of infertilities according to the original causes that may stem from the male, female partner or from a combination of causes from both partners, or remain unexplained. We thus considered as denominator, only couples visiting the fertility clinics and that have been seeking child unsuccessfully for at least one-year period. In those cases, the proportion of male infertility was calculated as infertile couples (denominator) where the man had semen abnormalities (azoospermia, oligospermia, asthenospermia, necrospermia, and oligo-asthenospermia) and the woman was diagnosed with no reproductive health issue (numerator). Reversely, the proportion of female infertility was calculated as infertile couples (denominator) where the woman presented reproductive health issue such as (uterine malformation or synaechia, tubal obstruction, ovulatory disorders, sequelae of abortion, abnormal cervical mucus, Shehan disease) and the man was diagnosed with no semen abnormalities (numerator).

The proportion of mixed infertility (infertility due to a combination of male and female factors) was measured as infertile couples (denominator) where both man and woman were diagnosed with reproductive health illness (numerator). Lastly, the proportion of unexplained infertility was the case of infertility where both male and female partners presented no reproductive health illness. Regarding men semen quality, we used available semen analysis data from the patients' medical files. We presented the frequencies of the semen impairments using WHO 1992 definition (World Health Organization, 1999; Esteves and Agarwal, 2011).

We used the t-test to compare means and the Wilcoxon-Mann-Whitney test to compare proportions in STATA/SE 13.1 (4905 Lakeway Drive College Station, Texas 77845 USA).

$$P = \qquad P_m = \frac{b}{a} \qquad P_f = \frac{c}{a}$$

$$P_c = \frac{d}{a} \qquad P_u = \frac{e}{a}$$

where
P= general infertility prevalence
Pm= male infertility prevalence
Pf= female infertility prevalence
Pc= mixed infertility prevalence
Pu= unexplained infertility prevalence
N= total number of people attending study clinics whatever the reason
a= couple seeking a child unsuccessfully for more than 12 months,
b= men with reproductive health problems (semen impairements) and whose wives/partners have no reproductive health issue
c= men with no reproductive health problems (semen impairements) and whose wives/partners have a reproductive health issue
d= both partners have a reproductive health issue
e= none of the partners have a reproductive health issue.

Ethics

All authorizations were obtained from regulatory and administrative health authorities including the health authorities of the Centre Region and the National Ethics Committee for Health Research. We conducted the study according to the principles of Helsinki Declaration. The sponsor had no role in the design, implementation of the protocol nor the analysis of the data and the presentation of the data in the current manuscript.

RESULTS

Socio-demographic characteristics

Between 14 and 18th January, 2013, a cross-sectional study was conducted in ten private and five public health centres (four private clinics denied access to their registries and patients' files because they were concerned about confidentiality). We collected data from 6 982 patients and analyzed 6642 subjects. The mean age of male partners was 36.4 (95% CI: 35.3, 37.6). With respect to mean age and marital regime, the fertile and infertile women were similar. More fertile women were married in comparison to infertile ones (p<0.01) (Table 1). Since we only collected infertile men socio-demographic characteristics, we were not able to make a comparison with fertile men.

Characteristics of infertility

The proportion of infertile men with more than 50% motile spermatozoa and less than 30% spermatozoa of normal morphology was 30.7 and 6.1%, respectively (Table 2).

Regarding semen quality, the distribution of abnormalities was balanced between necrospermia, oligospermia, azoospermia and asthenospermia. Overall, 15.1% of infertile couples presented male semen impairments (Table 3).

The prevalence of infertility in the general population was 1 179 couples representing 17.8% (95% CI: 16.8, 18.7) of the population.

Unexplained infertility was 62.5% of all infertility (Figure 1). Unexplained infertility steadily decreased over years while the male semen impairments were fluctuating, mostly between 2006 and 2009. Female infertility and male semen abnormalities had a pick between 2009 and 2010, while the male infertility rate was slightly decreasing before taking a slight but steady positive slope until the end of the survey (Figure 2).

DISCUSSION

In 62.5% of the cases, we were not able to find any original causes to the infertility. Unexplained infertility tended to decrease over the years from 2006 to 2012. Infertility due to male factors was 8% of the cases.

Socio-demographic data

In a study in Nigeria (Nwajiaku et al., 2012), the mean age of the male partners was 39.1±6 years (higher than the mean age of our males sample); the mean duration of infertility was 5.0 years lower than our mean duration of 70 months. In a study in military population in Brest (France), the mean ages were 31.6 and 30.0 years for infertile men and women, respectively. The mean duration of infertility was 37.9 months (Velez de la Calle et al., 2001). In less developed countries, infertile couples used to present later at fertility clinics to seek care. This may explain these important differences regarding age and duration of infertility with the French population.

Origin and etiology of infertility

In a study on global male infertility showing regional differences, when the authors presented the data based on various studies reporting male or female infertility, the prevalence of infertile males ranged between 2.5 and 4.8 in SSA, while the percentage of couples that were reported infertile ranged from 12.5 to 16% (Agarwal et al., 2015). Though the infertility prevalence was similar to our finding (17.8 95% CI: 16.8, 18.7) and to the one in Nigeria (18.5%) (Nwajiaku et al., 2012), the male infertility rate was lower compared to our results (7.7 95% CI: 6.3, 9.5). The authors themselves estimated that there might be an underestimation of the male infertility rate in SSA due to an underreporting because of cultural differences, patriarchal societies and traditions (Agarwal et al., 2015). When they extrapolated the data from WHO results on infertile women, North and West Africa rates ranged from 4.24 to 6.35%, more similar to our finding. Therefore, our results may be closer to the reality because minds are

Table 1. Comparison of the socio-demographic data of fertile and infertile women.

Socio-demographic data	Infertile women	Fertile women	Statistical significance*
Mean age (years)	30.0 (29.6, 30.4)	29.6 (29.4, 29.8)	P=0.1
Mean duration of infertility (months)	69.8 (60.6, 79.0)	-	
Marital status			
Married	95.8 (93.3, 97.4)	96.6 (95.1, 97.7)	P<0.00
Cohabitant	4.2 (2.6, 6.7)	3.4 (2.3, 4.9)	
Marital regime			
Monogamy	73.2 (64.5, 80.3)	74.8 (66.6, 81.6)	P=0.3
Polygamy	26.8 (19.7, 35.5)	25.2 (18.4, 33.4)	

*We tested the hypothesis that infertile women are different from fertile women

Table 2. Characteristics of male semen in infertile men.

Characteristic	Study values (IC 95%)	Normal values as per WHO 1992 standards (Esteves and Agarwal, 2011; WHO, 1999)
Mean ejaculate volume (ml)	3.0 (2.8, 3.3)	≥2.0
Mean spermatozoa count per ejaculate ($\times 10^6$)	56.4 (44.4, 68.3)	≥40
Proportion of motile spermatozoa (%)		≥50
<50	69.3 (60.1, 77.2)	-
≥50	30.7 (22.8, 39.9)	-
Proportion of spermatozoa with normal morphology (%)		≥30
<30	6.1 (2.9, 12.3)	
≥30	93.9 (87.6, 97.1)	

Table 3. Distribution of the male semen abnormalities.

Spermogram impairment	Frequency	Percentage according to the total number of men with semen abnormalities	Percentage according to the population of infertile couples
Necrospermia	39	24.4	3.7
Oligospermia	37	23.1	3.5
Azoospermia	32	20.0	3.1
Asthenospermia	25	15.6	2.4
Border-line spermogram	18	11.2	1.7
Oligoasthenospermia	5	3.1	0.5
Rare cases	4	2.5	0.4
Normal spermogram	901	-	84.9

changing and it is now accepted that a man can be infertile. As a result, more and more men undergo fertility assessment. Compared to the results of the same study from WHO results (Agarwal et al., 2015), our finding on male infertility rate was closer to the rates in regions like Europe or Australia and was included in the global rates range (2.5 to 12%). The differences of our results from the 25% of male infertility, 45% of female infertility and 20% of unexplained infertility found in Nigeria was important (Nwajiaku et al., 2012). Our results regarding male infertility were also different from the findings of an Iranian study with 23.7% of male-related factor and 19.3%
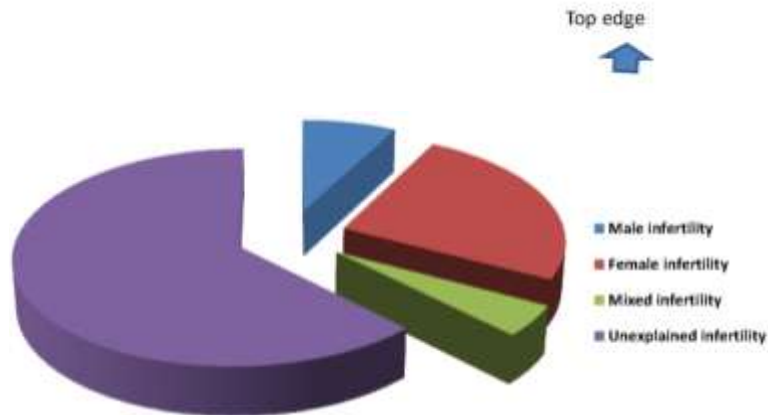
Figure 1. Distribution of the original causes of infertility in the couples.
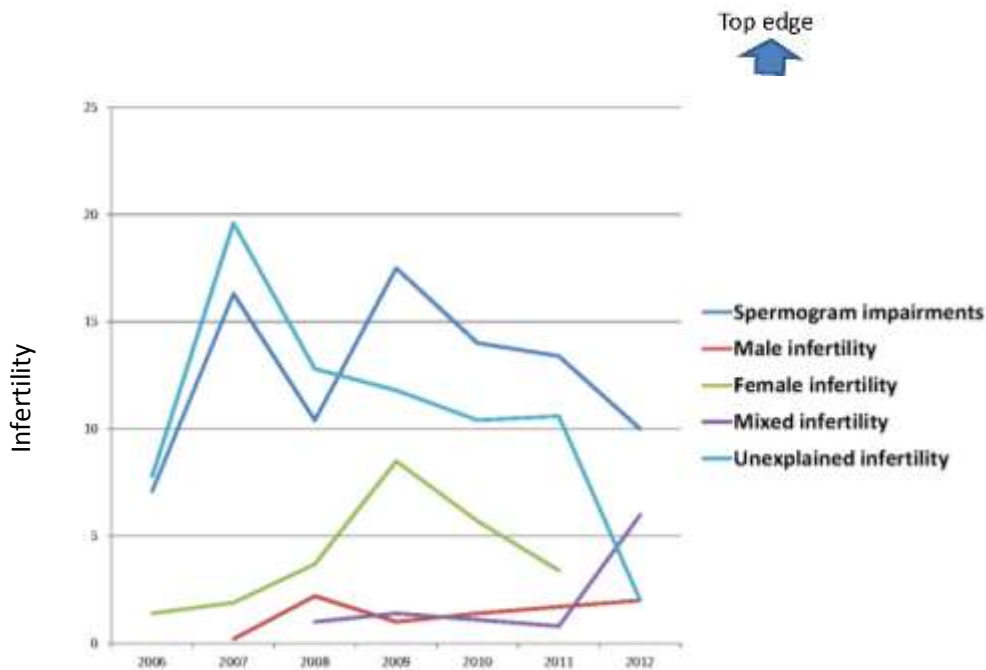
Figure 2. Changes in the causes of couple infertilities from 2006 to 2012.

of combined male-female-related factor (Sohrabvand et al., 2015). These differences may be due either to the studies' design or to real country specificities knowing that male infertility are influenced by environmental factors including daily life habits and pollution (Turek, 2008; Multigner and Oliva, 2001; Oliva et al., 2001; Wong et al., 2003).

In studies in French regions (Thonneau et al., 1991) and Southeastern Nigeria (Ikechebelu et al., 2003), the female factor for infertility represented 30 and 25.8%, respectively, close to our finding. In a review to examine trends in male infertility in the United Kingdom, the

authors found a prevalence of women suffering from infertility ranging from 14 to 26% (Povey and Stocks, 2010). On the contrary, regarding combined (male and female factors) infertility, our finding was lower than the 20 to 40% presented by Agarwal et al. (2015) when they reported data based on various studies reporting male or female infertility. However, we had a high rate of unexplained infertility. Our hypothesis was that due to limitation in means of diagnosis in Burkina Faso as well as in many areas in SSA and to financial constraints, many couples cannot undergo a thorough fertility exploration, thus this high rate of unexplained infertility. It

might also be due to "the trend of deferring attempts to conceive and an increase in women's age (Povey and Stocks, 2010). Cultural differences and traditions might have played a role here too. Interestingly, over the years, the proportion of unexplained infertility steadily decreased. This may confirm our results that lack of diagnosis resource including qualified human resource contributed at the beginning at the high rate of unexplained infertility that decreased with the development of the health sector. Anyway, one should keep in mind that the high rate of unexplained infertility may be related to multifactorial causes. When the data were extrapolated from WHO results, the combined infertility rate lowered to 7.1% closer again to our rate.

In another study in Southeastern Nigeria, the main semen fluid abnormalities were asthenozoospermia (16.7%), astheno-oligozoospermia (14.7%) and astheno-oligoteratozoospermia (13.2%). Azoospermia represented only 1.4% (Ugboaja et al., 2010). These results were different from ours' where necrospermia, oligospermia and azoospermia were the three leading abnormalities while oligoasthenospermia represented only 3.13%. Both studies were retrospective ones and might not be fully comparable by design.

We reported physician-synthesized data from patients 'files while the Nigerian study reported data directly from lab files. In another study in Nigeria, oligospermia and asthenozoospermia were the leading causes with respectively 60.9 and 17.4%, while azoospermia represented only 13.0% (Nwajiaku et al., 2012). Our results presented also different abnormalities compared to the Iranian study (Sohrabvand et al., 2015).

We agree with the authors of this latter study that in terms of infertility assessment, according to different geographical conditions and habits, the male factor infertility may present different causes and characteristics (Sohrabvand et al., 2015).

In a study that assessed the quality of semen during the past 50 years, the mean sperm count decreased from 113×10^6/ml in 1940 to 66×10^6/ml in 1990 (p<0.0001) and the mean seminal volume from 3.40 to 2.75 ml (p=0.027) (Carlsen et al., 1992). We found 3.0 (95% CI: 2.8, 3.3) ml and 56.4×10^6 (95% CI: 44.4, 68.3) for seminal volume and sperm count, respectively for a period of 10 years from 2003 to 2012. However, our data was related to infertile men, while Carlsen et al. (1992) study referred to fertile men.

Our finding fitted in the WHO normal values for seminal volume and sperm counts.

It was believed that infertility due to male factors in our population was more related to the sperm quality (morphology, motility and vitality of the spermatozoa) than the count or volume.

We should also acknowledge that many aspects of the male semen profile according to WHO (among which the semen volume and count) are subjective and not evidence-based.

Therefore, it is difficult to make an accurate diagnosis with respect to infertility due to male factors (Irvine, 1998).

Study limitations

A retrospective study was conducted with data collected from hospital registries and patients' files. Therefore, we had to face the challenge of missing or incomplete data. Regarding the semen quality assessment, semen analysis results were used from different laboratories that may have used different procedures as acknowledged in many critics of semen analysis (Cooper et al., 2010). This lack of standardization of the procedures might have also led to the differences that our results presented regarding the semen anomalies.

Our study was a clinic-based survey and thus, would be expected to underestimate the general prevalence of infertility since only those couples seeking care would be counted.

The missing data made it a non-representative population. However, we believe that our findings allowed grabbing the essential trends of couple infertility in Burkina Faso which is critical to design new studies that will investigate more deeply the phenomenon in order to provide more efficacious response to the patients.

Conclusion

The couple infertility in Burkina Faso was within the global infertility range of rates. Unexplained infertility rate was higher than many similar studies. However, over the years, this proportion tended to decrease. In general, the different categories of infertility kept fluctuating over time without any clear tendency to a trend. However, we were able to perceive a slight increasing trend for male infertility starting around 2009. Though controversial, this tendency was more coherent with the hypothesis that male semen quality is decreasing while male infertility is increasing. Prospective studies are needed to investigate more deeply these findings to confirm the specificities of the couple infertility in Burkina Faso as well as the contributions of both male partner and environmental influence in this phenomenon.

Conflict of interests

The authors have not declared any conflict of interests

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Full Length Research Paper

Italian midwives attitude toward complementary and alternative medicine

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The growing interest in Complementary and Alternative Medicine (CAM) applies also to the field of obstetrics and this encouraged midwives to support the application during pregnancy and delivery. Application of CAM is complete according to the skills and the aims of the midwife's professional profile, representing as it does a safe non pharmacological approach which endorses both the autonomy of women and midwives' professional autonomy. The aim of the present study is to investigate the midwives attitude to CAM application in Emilia-Romagna region located in the North-Italy. This observational study investigated by a written questionnaire 525 midwifes referred to the hospitals and freelancers of Modena, Reggio Emilia, Forlì Rimini and Cesena cities. In such sample, a high involvement of midwives in CAM reaching the 90 to 100% either for hospital/territorial workers or freelancers was observed. Breech presentation and labour management represents the most frequent indication followed by hyperemesis gravidarum. The methods most frequently applied are acupression and moxibustion, homeopathy, relaxation and massage and osteopathy. These midwives were also interviewed about the CAM training expectations: the opportunity to receive teaching during degree is wished by 70% of them, whereas 30% preferred a post-degree training. This represents a preliminary study facing for the first time the attitude toward CAM in Italy, even if the sample size do not allow to reach strong conclusion, some considerations could be drawn: the high compliance showed by midwives should stimulate the increase of CAM offered in public health services and the request also for a qualified training during degree or post-degree studies should promote an enlargement of teaching offer.

Key words: Complementary alternative medicine midwives, training.

INTRODUCTION

The growing interest in Complementary and Alternative Medicine (CAM) applies also to the field of obstetrics. This encouraged midwifes to support the application during pregnancy and delivery. The application of CAM is in complete agreement with the skills and the aims of the midwife's profession, representing as it does a safe non pharmacological approach which endorses both the autonomy of women and midwives' profession (Hall et al.,

2012).

However, the involvement of midwives in the application of CAM raises the question regarding educational training, because non-conventional medications are not included in the teaching program.

The available data in the application of CAM are not consistent and fragmentary. A study performed in South Australia by a postal questionnaire showed that 78% of the 145 midwives interviewed advised women to use CAM during pregnancy and delivery (Gaffney and Smith, 2004). Similar data were found in North-American countries (Hasting-Tolsma and Terada, 2009). Conversely, a study performed in New-Zealand and Canada reported a 40% usage of CAM in a sample of 648, midwives motivated by a lack of interest, religious conflicts and doubts about suitability (Harding and Foureur, 2009). Furthermore, an investigation in Turkey showed that, aside the applications of CAM, 60% of 129 midwives of the family health centers were particularly interested in herbal treatment (Koc et al., 2012).

The aforementioned study reported also that the methods most midwives apply frequently are acupuncture, homeopathy, herbal treatment, and massage (Hall et al., 2012; Gaffney and Smith, 2004; Hasting-Tolsma and Terada, 2009; Harding and Foureur, 2009; Koc et al., 2012). The obstetrics indications requiring CAM application were: fetal malposition, hyperemesis gravidarum, back pain and lactation support (Hall et al., 2012; Gaffney and Smith, 2004; Hasting-Tolsma and Terada, 2009; Harding and Foureur, 2009; Koc et al., 2012). In Turkey report, other indications as common cold, constipation, gastric complaints, insomnia and asthenia are reported (Koc et al., 2012). However, no strong considerations can be drawn considering the relevant heterogeneity of the available studies.

The aim of the present study is to investigate the techniques of the application of CAM by midwives in Emilia-Romagna region located in the Northern Italy. To date, no data about such issue have been published in Italian countries.

MATERIALS AND METHODS

The 525 midwives referred to the hospitals and also freelancers of Modena, Reggio Emilia, Forlì Rimini and Cesena cities were invited to fill questionnaires. The questionnaire included 17 items on CAM techniques. The questionnaires were sent by mail and the answers were requested within 60 days.

A written consent to participate in the study was requested at the end of questionnaire with a specific sentence: "Do you agree that the data obtained by questionnaire be processed and published?"

In details, questionnaire included information as follows (Figure 1):

(1) Demographic data, school degree, previous work experience and actual work position (Group 1-6 items);
(2) Knowledge, motivations and frequency of MNC utilization in the clinical practice (Group 2-7 items);
(3) Most frequent techniques used (Group 3-2 items);

(4) Kind of training received and eventual further training needed to deep the knowledge (Group 4-2 items).

The questionnaire was structured to take into account the interviews reported in the previous studies (1-5). Before commencement of the study, the questionnaire was administered to a sample of 10 midwives who were referred to the Mother-Infant Department, in order to check eventual misunderstanding and difficulties in filling the questions. The results of such evaluation were not included in the final analysis. The e-mail invoice endorsed to reach a large sample of midwives, referred to the whole region. However, such approach caused several methodological biases. Lack of information on the eventual difficulties in filling the questionnaire or misunderstanding causing higher rate of drop-out was more peculiar.

RESULTS

Demographic data

Among the 525 midwives interviewed, only 154 of them filled the questionnaire and the final analysis was performed on 147 cases, because 7 of them were not completely filled. The mean age is about 37.7 (years) and 144 cases were females. The participants' job experience is homogeneously represented: lower than 5 years, 28%; between 5 and 20 years, 35%; and 20 years and above, 37%. All the midwives are graduates and 17% of them have also obtained a post-degree master. The hospital is the most prevalent place of work (71%) followed by territorial service (22%) and Freelancer represent just 7% of the sample.
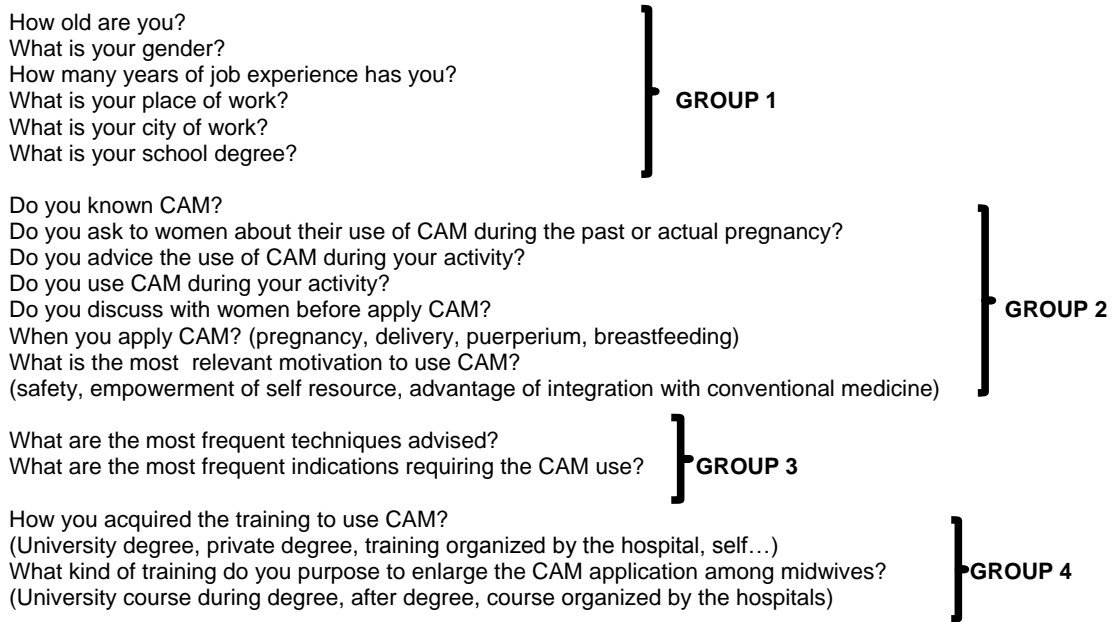
CAM application

All the midwives interviewed refer to well-known CAM and 75% of them were reported to have conversed with women about the possible use of such methods not just during pregnancy but also in other periods of life like, postmenopausal transition or menstrual disorders.

Also, about 90% of the midwives working at the hospital and all of them at the territorial service (100%) advice women to use CAM. Similarly, the direct involvement is very high. Midwives at the hospital (75%), territorial service (97%), and freelancer midwives (90%) apply CAM during their daily clinical practice with 90% of women's compliance. As far as the midwives motivation to apply CAM is concerned, the most relevant is the safety for both mother and neonate followed by self-resources empowerment (Figure 2).

Breech presentation and labour management represent the most frequent indications to CAM use followed by hyperemesis gravidarum and breastfeeding support. Other indications rarely reported are: low-back pain, neck and arms pain, hemorrhoids, constipation, insomnia, fatigue and common cold.

The commonly applied methods are acupression and moxibustion, homeopathy, relaxation and massage,

How old are you?
What is your gender?
How many years of job experience has you?
What is your place of work?
What is your city of work?
What is your school degree?

GROUP 1

Do you known CAM?
Do you ask to women about their use of CAM during the past or actual pregnancy?
Do you advice the use of CAM during your activity?
Do you use CAM during your activity?
Do you discuss with women before apply CAM?
When you apply CAM? (pregnancy, delivery, puerperium, breastfeeding)
What is the most relevant motivation to use CAM?
(safety, empowerment of self resource, advantage of integration with conventional medicine)

GROUP 2

What are the most frequent techniques advised?
What are the most frequent indications requiring the CAM use?

GROUP 3

How you acquired the training to use CAM?
(University degree, private degree, training organized by the hospital, self…)
What kind of training do you purpose to enlarge the CAM application among midwives?
(University course during degree, after degree, course organized by the hospitals)

GROUP 4

Figure 1. The items of the questionnaire divided into 4 groups accordingly to the issue investigated. Group 1 (6 items): demographic data, school degree, previous work experience and actual work position. Group 2 (7 items): knowledge, motivations and frequency of MNC utilization in the clinical practice. Group 3 (2 items): most frequently techniques used. Group 4 (2 items): kind of training received and also eventual further training needed to deep the knowledge's.
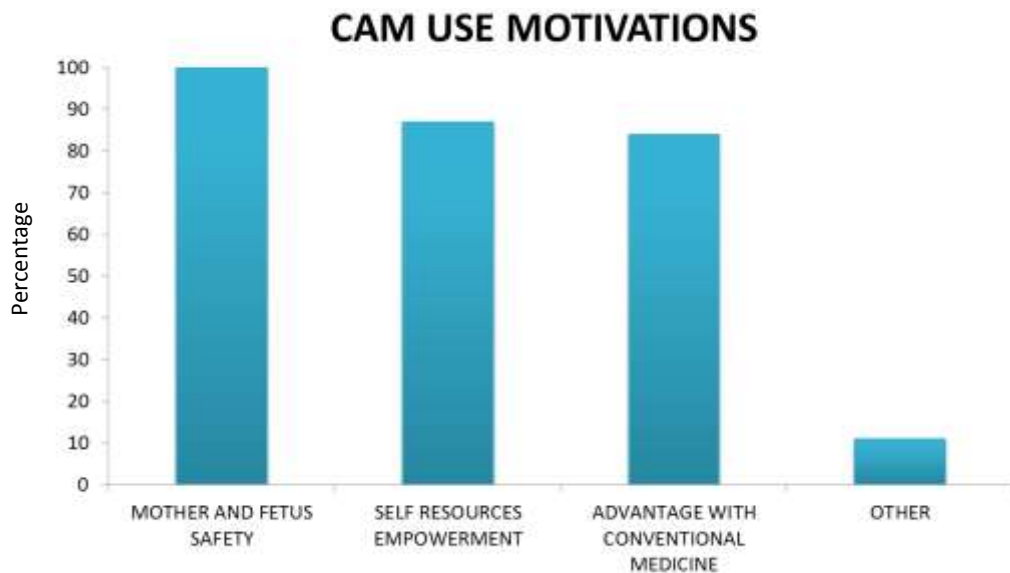
**Figure 2.** The midwives motivations to apply CAM.

osteopathy and others (Figure 3).

CAM training

The CAM training is performed by private courses (47%), organized by hospital or territorial services (30%) and universities (20%).

The midwives were also interviewed about the importance of CAM training. 70% of them wished for the opportunity to acquire the knowledge during first degree, while 30% preferred a post-degree training. Also, half of
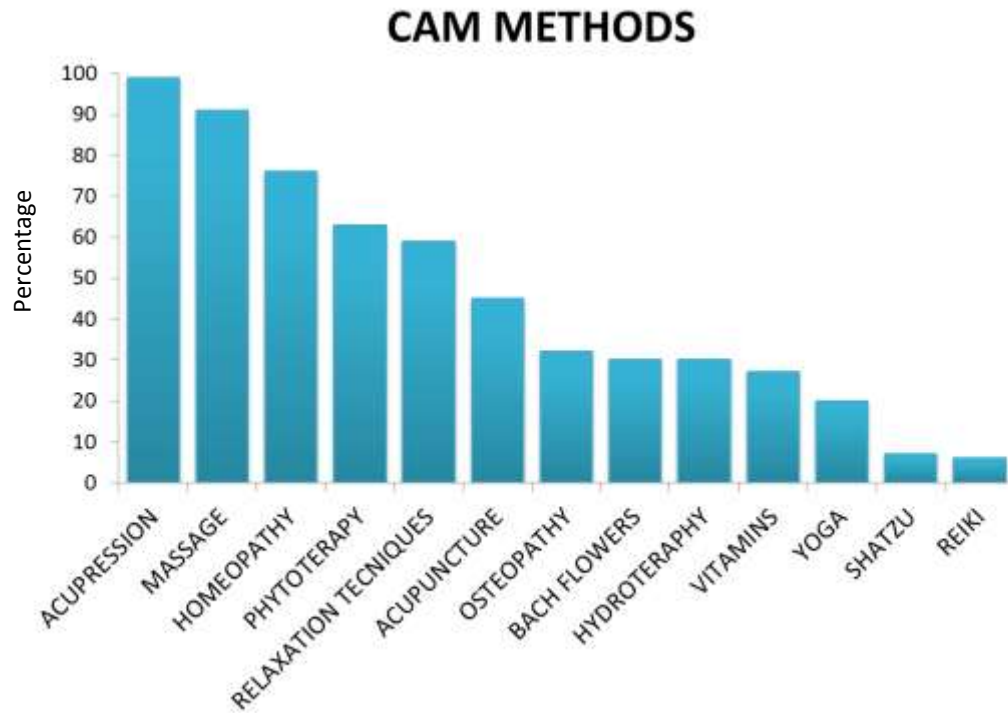
CAM METHODS

Figure 3. The CAM methods applied.

the midwives look forward to training organized by hospital or territorial services.

DISCUSSION

This study reports a high involvement of midwives in CAM reaching 90 to 100% either for hospital/territorial workers or freelancers. Breech presentation and labor management represents the most frequent indication followed by hyperemesis gravidarum. A further analysis should give more information about the application for labor and delivery which was not particularly be indicated in the questionnaire.

Acupressure and moxibustion are the most frequent methods applied followed by massages, phytotherapy and homeopathy. In Italy, acupuncture application is not allowed by midwives. Five years ago, Emilia Romagna region started with specific moxibustion training for midwives to offer a no pharmacologic approach for breech presentation. This explains the increase in the percentage of midwives who prescribe the use of moxibustion and acupressure.

A plan for acupressure training for labor and delivery has also been organized in order to offer the method to the women considered not eligible or refusing epidural analgesia.

As far as homeopathy and phitotherapy use is concerned, the questionnaire did not investigate the kind or dosage of the substances that are prescribed to the women. Further evaluation should be taken into account, and more details of each method considered.

Midwives stated they would want to be trained by private courses or by hospital and territorial service. In fact, the need to receive a CAM teaching during degree was reported by 70% of them. Such data could be considered by universities institution.

The small sample of questionnaire processed does not allow for strong conclusions about CAM use. Further evaluations should consider different investigation approach in order to avoid the high rate of drop-out experienced at the onset of the present study.

However, considerations that could be drawn from the first study are the high rate of midwives who are looking forward to a qualified training during degree or post-degree studies. Furthermore, their high compliance should stimulate the increase in the application of CAM offered in public health services.

Conflict of Interests

The authors have not declared any conflict of interests.

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