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Morbi-Mortality Linked to Unsafe Abortions—Difficulties in Accessing Safe Abortions in Cameroon: Meta-Analysis and Systematic Review

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Abstract

Background: Unsafe abortions are one of the leading causes of maternal mortality, especially in developing countries. In Cameroon, the maternal mortality rate remains high, and the scarcity of data on abortions leads to a lack of solid evidence to advocate on the extent of the abortions related complications. Our objective was to evaluate the unsafe abortions related complications, and to assess the difficulties of accessing safe abortions in our setting. **Methods:** We carried out a meta-analytic and systematic review in the biomedical databases MEDLINE (Pubmed), Google Scholar and African Journal Online concerning unsafe abortions and/or difficulties in accessing safe abortions in Cameroon. The keywords used for the search are seen in table I. Selection of studies was simultaneously done by two authors. Data were extracted through a form designed on Google Form. We used a random-effect model for proportion estimation, and The I^2 and Q statistics to assess the ex-

tent of heterogeneity. **Results:** A total of 430 studies were identified, from which 28 were included and analysed. About 5% (95% CI: 3 - 7) of unsafe abortions leads to death. The contribution of unsafe abortions in maternal deaths was 23% (95% CI: 20 - 27). The rate of severe bleeding and/or anemia were 40% (95% CI: 18 - 63) and the rate of infection was 17% (95% CI: 7 - 28), dominated by pelvic infections, pelviperitonitis, severe sepsis, and septic shock. Case reports described uterine perforations, uterine rupture during the following pregnancy. Abortion was performed in the practitioner's or patient's home in 41.4% of cases, in a health center in 35.1% of cases, in a private clinic in 21.2% of cases, drugs selling places and in traditional healer clinics. The restriction of abortion laws, the stigma surrounding abortion and its consequences at any level of the society, lead to the underreporting of unsafe abortions and a deep reluctance to advocate for safe abortion services. **Conclusion:** The strengthening of awareness campaigns for provider behavior change communication, family planning, the de-stigmatization of abortions, the training of health personnel in post-abortion care, a multidisciplinary and multicentric action would contribute to the reduction in morbidity and mortality due to abortions.

Keywords

1. Introduction

Abortion is the termination of pregnancy before the legal term of viability, which is set at 22 weeks of pregnancy by to the World Health Organization (WHO) and in developed countries and at 28 weeks in developing countries [1]. In year 2017, 295,000 women died in the world from pregnancy related complications [2], with 86% occurring in sub-Saharan Africa ($2/3^{rd}$) and in South Asia [3]. From 2011 to 2018, mortality (MM) fell in Cameroon from 782 [4] to 406 deaths per 100,000 live births [5], rate which remains high. Unsafe abortion, which is a procedure for terminating pregnancy either by a person who lacks the necessary skills or in an environment where minimum medical standards are not met, or both [6], is among the 5 top causes of maternal death worldwide [7]. Almost 1 pregnancy in 10 ends with unsafe abortion [8]. In Africa, the MM due to abortions is high, since 99% of these abortions are unsafe [9] [10]. A hospital-based data in 2015 in Yaoundé found hemorrhages (29.2%), unsafe abortions (25%) and ectopic pregnancies (12.5%) as the main causes of MM [11]. Knowledge of the contribution of abortions to MM, thus the better management with comprehensive abortion care will contribute to the attainment of the 3rd objective of sustainable development which is to "enable everyone to live in good health and to promote the well-being of all and at all ages" by 2030 [12]. Our general objective was to evaluate the morbi-mortality due to unsafe abortions, and to highlight difficulties encountered by any stakeholders in accessing safe

abortions care in Cameroon.

2. Methods

2.1. Study Type

This was a systematic and meta-analytic review of the literature on researches carried out in Cameroon. This review had two parts: a review of quantitative studies and a review of qualitative studies (including expert opinions or editorial letters). The extracted quantitative data were meta-analyzed to produce compiled estimators of the main results.

2.2. Eligibility Criteria

2.2.1. Type of Studies Included

For the quantitative component, we included descriptive cross-sectional and/or analytical studies, case-control studies, cohort studies (whether prospective, retrospective or ambidirectional), case series and/or case reports. To be included, the study had to have been conducted in Cameroon.

Regarding the qualitative aspect, were included the qualitative research work carried out in Cameroon, as well as any other document that may contain relevant information on the therapeutic paths used by patients in order to benefit from an abortion, and/or the difficulties encountered by patients seeking a safe abortion, and/or difficulties encountered by other stakeholders in the abortion care.

2.2.2. Type of Participants

Studies on patients of childbearing age, received in any health facility in Cameroon with a diagnosis of unsafe abortion were included. We also included community studies and those of health personnel or other stakeholders involved in the abortion care in Cameroon, the objective of which was to assess the difficulties encountered in the practice of abortions in Cameroon.

2.2.3. Outcome

Regarding unsafe abortion, we considered the WHO definition [6]. In addition, we also considered unsafe abortion all cases described as such by the authors, regardless of the definition used. In terms of morbidity and mortality, we considered all possible complications of abortion, including infections, uterine perforations, bleeding, and death.

2.3. Selection Criteria

Were included for the quantitative part of this review were: 1) studies carried out in Cameroon, whether community or hospital; 2) including patients of childbearing age or health personnel or other stakeholders involved in the management of abortions in Cameroon; 3) reporting data on morbidity or mortality linked to unsafe abortions, or information on the difficulties encountered by patients or practitioners in accessing a safe abortion. Studies including participants

from countries other than Cameroon, as well as systematic reviews and studies of other types of abortion were excluded.

For the qualitative aspect, were included the qualitative studies carried out in Cameroon, describing the difficulties encountered by stakeholders for access to safe abortions. We also included expert opinions, editorial letters and other documents describing the difficulties encountered.

2.4. Research Strategy

The literature search was conducted without date restriction in three online databases, namely MEDLINE (Pubmed), Google Scholar and African Journal Online (AJOL). The search strategy was constructed using the logical framework "Context, Condition, Population (CoCoPop)", combining the MeSH (Medical Subject heading) terms and the words from the text related to unsafe abortions, complications and place of study. Table 1 below describes the search strategy that was used in MEDLINE and adapted for searching in other databases. The search of articles to the extraction lasted from July to August 2021.

References of selected articles were manually reviewed and searched to identify relevant studies that would not have been found by searching online. The literature search was conducted by an experienced researcher in literature review, without language restriction. For studies published in a language other than French or English, we used Google Translation for the translation.

The search results were loaded into the "Rayyan" online software for the identification and management of duplicate articles. This software was also used for the selection of titles and abstracts [13]. The number of items found or retained at each step is described in results section), following the model described in the PRISMA recommendations [14].

2.5. Selection of Articles

Two independent researchers reviewed the titles and abstracts of all documents

Table 1. Search strategy used in MEDLINE and adapted to other databases.

N°	Strategy
#1	Complications OR Complication OR Bleeding OR Hemorrhage OR infection OR infertility OR pelvic pain OR Cost OR Law OR bowel perforation OR ectopic pregnancy OR outcome OR prognosis OR morbidity OR mortality OR morbi-mortality OR death OR infertilité OR douleur pelvienne OR coût OR loi OR perforation OR grossesse extra-utérine OR prognostic OR mortalité OR morbidité OR morbi-mortalité OR décès
#2	Cameroon OR Cameroun OR Yaounde OR Yaoundé OR Douala OR Buea OR Bafoussam OR Garoua OR Maroua OR Ebolowa OR Bertoua OR Bamenda OR Ngaoundéré
#3	Unsafe Abortion OR voluntary interruption of pregnancy OR voluntary abortion OR abortion OR avortement OR IVG OR interruption de grossesse
#4	#1 AND #2 AND #3

obtained after the literature search to confirm and exclude duplicates. Then, they assessed all these articles and other documents using the inclusion and exclusion criteria to confirm eligibility. The full article of eligible studies was searched and uploaded for in-depth analysis to decide whether to include the study. In the event of a disagreement between the two researchers, a third member of the team served as the referee for the final decision on the conflicting items.

2.6. Data Extraction

An online form was designed using Google Form software containing the data to be extracted for the quantitative part. Two independent researchers extracted data from each included study. The discrepancies were also managed by the intervention of a third team member to decide what information to retain for these variables. The detailed data extraction form is presented in Table 2. The variables collected from each study or document were: Information on the selection and extraction of data (name of the researcher, date of extraction, confirmation of study eligibility for the review), study characteristics (name of the first author, title of the article or document, year of publication, location of the study, number of recruitment sites, type of study and sampling method), the participants (the number of participants, the average age of the participants), data related to unsafe abortions (Percentage of patients with a history of unsafe abortion, the reasons for these abortions and the respective percentages, the abortion methods and the respective percentages, the people who performed these abortions and where they were performed with the respective percentages, the complications related to these abortions and the respective percentages, the proportion of maternal deaths related to unsafe abortions).

For the qualitative part, the data were extracted from studies by an experienced researcher in qualitative research. These were sections or paragraphs of documents containing information relevant to the objectives of the study.

Table 2. Description of complications from unsafe abortions in case reports

Author_year	Region	Number of cases	Age of patients (years)	Complications
Egbe_2018	Littoral	1	29	Pyosalpingitis, pelvic and perihepatic adhesions
Johnson-Hanks_2002	South	1	18	None
Nana_2009	Littoral	3	25; 19; 35	Uterine rupture in the next pregnancy
Ngandji_2017	Centre	1	33	Intra peritoneal foreign body (plastic catheter)
Ngowe_2008	Centre	1	34	Uterine perforation, Intestinal necrosis, Anemia
Nkwabong_2017	Centre	1	36	Uterine Perforation and Tubal Incarceration
Sama_2016	Centre	1	21	Uterine perforation, intraperitoneal foreign body (cassava stalk), septic shock
Tchuenkam_2021	Centre	1	26	Uterine perforation, Incarceration and intestinal necrosis
Weledji_2013	Centre	1	22	Uterine perforation, peritonitis, acute intestinal obstruction

2.7. Data Analysis

The extracted quantitative data were meta-analyzed to produce compiled estimators of the main results. We first proceed with a descriptive analysis of the studies. Heterogeneity between estimations was assessed using the I^2 statistic, which describes the percentage of variation unrelated to sampling error between studies. An I^2 value greater than 75% indicates high heterogeneity. Articles included in the meta-analysis were limited to those that reported data on morbidity and/or mortality from unsafe abortions. Likewise, case series and case reports were excluded from the meta-analysis. Meta-analysis was performed using a random-effects model (to account for heterogeneity) using the MetaXL add-on (https://www.epigear.com/) for Microsoft Excel. A pooled prevalence figure was calculated with a 95% CI. In a prevalence meta-analysis, when the estimate of a study approaches 0% or 100%, the variance of that study tends to zero and, therefore, its weight is overestimated in the meta-analysis. Therefore, we performed the meta-analysis with prevalence estimates that had been transformed using the double Arcsinus method. The final pooled result and 95% CIs were reverse transformed for ease of interpretation.

## 3. Results

3.1. Generalities

3.1.1. Flow Chart

Documentary research on MEDLINE (Pubmed), Google scholar and AJOL yielded 394 articles and published documents. Likewise, after discussions with some maternal health experts in Cameroon, and through research on other websites, 36 articles were found, making a total of 430 articles. Figure 1 depicts the flow diagram of the studies included in this work.

Of a total of 430 articles identified, 136 were duplicates and 230 were excluded from the analysis of titles and abstracts. Subsequently, 64 articles underwent an in-depth full-text assessment to confirm eligibility. Of these, 35 were excluded for the following reasons: 13 articles related to studies done in countries other than Cameroon, 13 articles did not contain data on abortion, and 10 more articles for other reasons.

At the end, 28 articles were included for data analysis, that's 18 for the quantitative part, 4 for the qualitative part and 6 for both parts. Of these 28 articles, 14 were not included in the meta-analysis because they were either case reports, case series, purely qualitative studies or studies that did not contain enough data to use in the meta-analysis.

3.1.2. Characteristics of the Included Studies

Among the papers included in this study, 05 were comments, documents or reports of organizations and 23 were studies on human beings including 09 case reports, 11 cross-sectional studies, 02 case control studies and one qualitative study. The majority of these 23 studies were carried out in the Center region (72, 7%) [11] [15]-[25] while 02 were carried out in the North -West [20] [24], 01 in
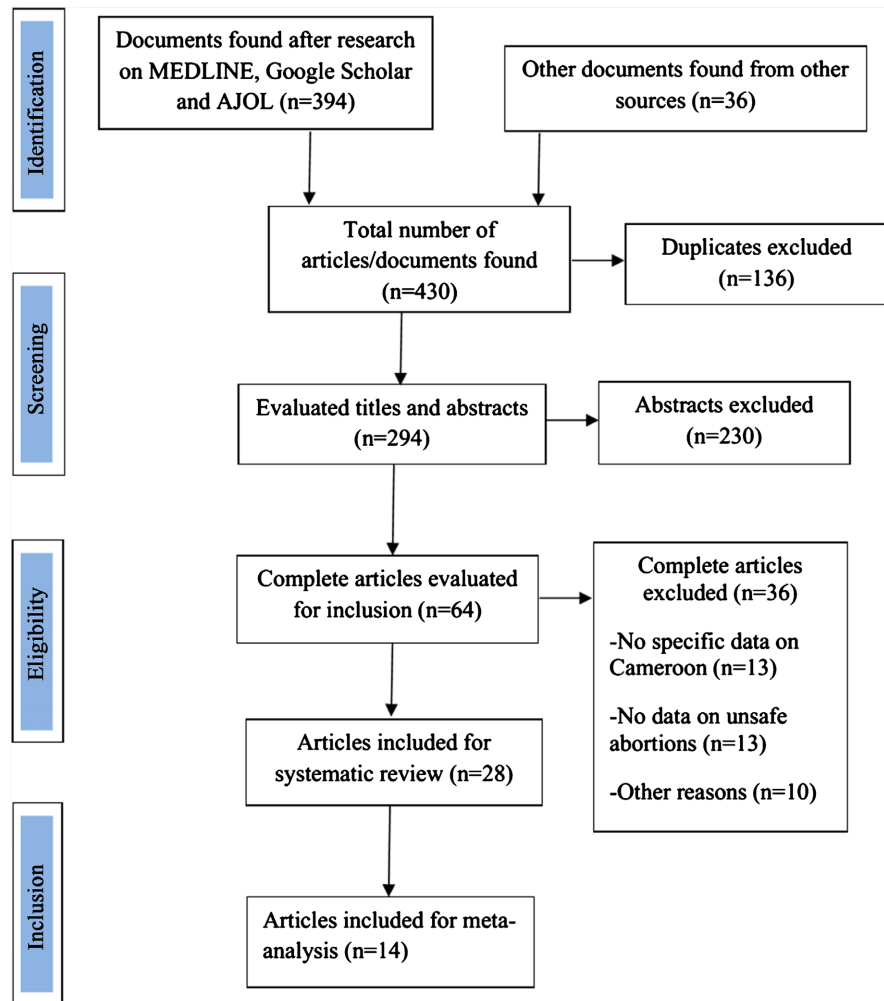
Figure 1. Flow diagram of studies included at each stage of article selection.

the South [26], 01 in the Southwest [27] and 01 in the Littoral [28].

Studies were carried out in a hospital in 82.6% of cases and in a community in 17.4% of cases. The oldest study was published in 1989 while the most recent were published in 2021 [20] [29]. For studies including humans, the sample size varied between 04 [20], and 509 participants [21].

3.1.3. Reasons behind These Unsafe Abortions

The determinants of abortions were: an unwanted pregnancy [30], postponing maternity to a more favorable time [27] [30], desire to continue their studies [21] [27] [30], refusal to have a child without being married [21] [27] [30], fear of parental disapproval [21] [27] [30], fear of humiliation by those around them [27], denial of the partner responsible for the pregnancy [27], financial difficulties [31] [32], desire to maintain their social status if they were not pregnant, lack of knowledge of women's reproductive health needs by service providers [33], lack of awareness of the complications problem of abortions, inability to meet the family planning needs of desiring persons [33], and restrictive abortions laws in Cameroon [33].

3.1.4. Methods Used to Induce Unsafe Abortions

The most cited means used for unsafe abortions were: endo-vaginal and endo-uterine maneuvers (dilation and curettage [21], manual intrauterine suction [34], Introduction of foreign bodies into the vagina or cervix (tubing of infuser, cassava stems or roots) [22] [35]), drugs [21] (sedatives, painkillers, anesthetics, antibiotics, chlorine, white quinine, prostaglandins (Misoprostol) [34], mifepristone [34], and vaginal ova [23]). The other substances were based on Aloes vera, castor oil, ground tobacco, salt and sugar water solutions, parsley oil, laxative, brandy and other drinks, Andrew's liver salt, hot pepper salt, papaya, physical charm, boiled beer, tea, Fanta, coca cola, detergent powder/soap, crushed bottles, paste acid, methylated spirits [35].

3.2. Mortality and Unsafe Abortions

3.2.1. Proportion of Maternal Mortality Attributable to Unsafe Abortions

We identified three studies describing the proportion of maternal mortality attributable to unsafe abortions, with a total of 496 deaths for the three studies [10] [11] [22]. The percentage of maternal deaths attributable to unsafe abortions ranged from 17% to 25%, with a compiled rate of 23% (95% CI: 20 - 27). In addition, there was little heterogeneity between the results of studies with $I^2 = 0\%$ and $p > 0.05$. **Figure 2** describes the results obtained after meta-analysis.

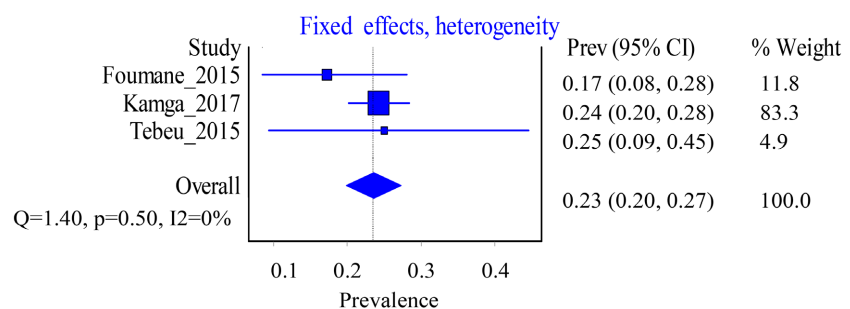### 3.2.2. Mortality Rate of Unsafe Abortions

In total, 05 studies reported a mortality rate of patients received for unsafe abortions, for a total of 236 participants [24] [25] [26] [29] [31]. The mortality rate ranged from 2% to 6%, with a compiled rate of 5% (95% CI: 3 - 7). Analysis revealed that there was little heterogeneity across studies with $I^2 = 0\%$ and $p > 0.05$. **Figure 3** depicts the mortality rates reported by the different studies.

3.3. Complications of Unsafe Abortions

3.3.1. Complications Described in Case Reports

All the case reports identified described cases of complications from unsafe abortions [19] [25] [27] [28] [36] [37] [38]. **Table 2** describes the characteristics of these patients.

The ages ranged from 18 to 36 years, and the total number of cases reported was 12 patients. The most common complication was uterine perforation reported

**Figure 2.** Proportion of maternal mortality attributable to unsafe abortions.

in 05 cases, followed by uterine rupture in pregnancy reported in 03 cases. An intraperitoneal foreign body was reported in 02 cases, and incarceration with necrosis of the tube or intestine was reported in 03 cases.

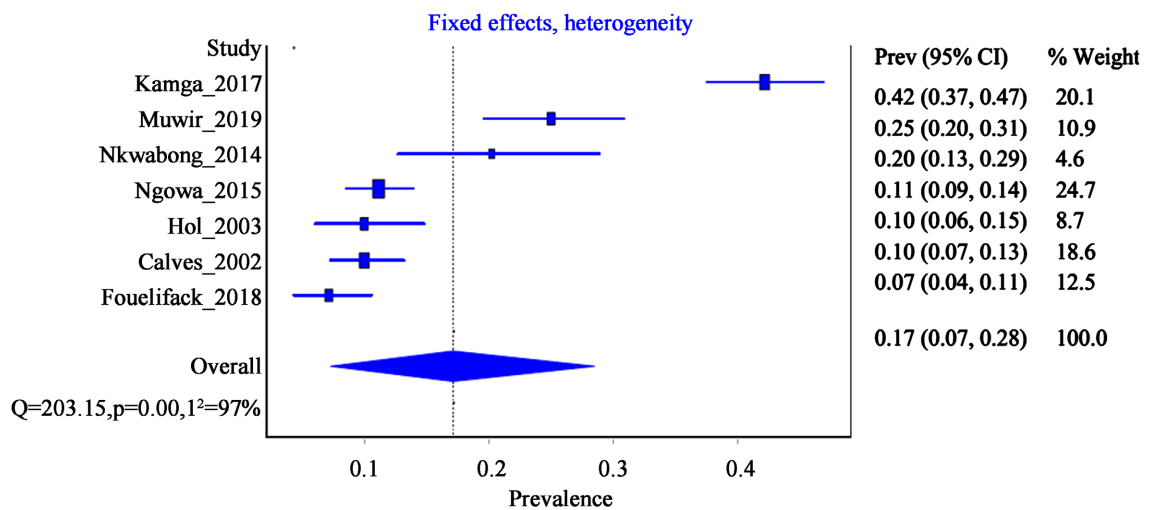### 3.3.2. Infections Associated with Unsafe Abortions

Several cross-sectional studies and control cases have also reported the complications of unsafe abortions. These included infections, bleeding and anemia.

Regarding infections, 07 studies reported the percentage of infections linked to unsafe abortions. **Figure 4** depicts the results of studies reporting the percentage of infections associated with unsafe abortions.

Frequencies ranged from 7% to 42%, with a combined prevalence of 17% (95% CI: 7 - 28). The infections reported in the different studies were pyosalpingitis, pelvic infections, pelviperitonitis by uterine perforation, severe sepsis or septic shock. There was however a strong heterogeneity across the published studies ($I^2 = 97\%$ and $p < 0.05$).
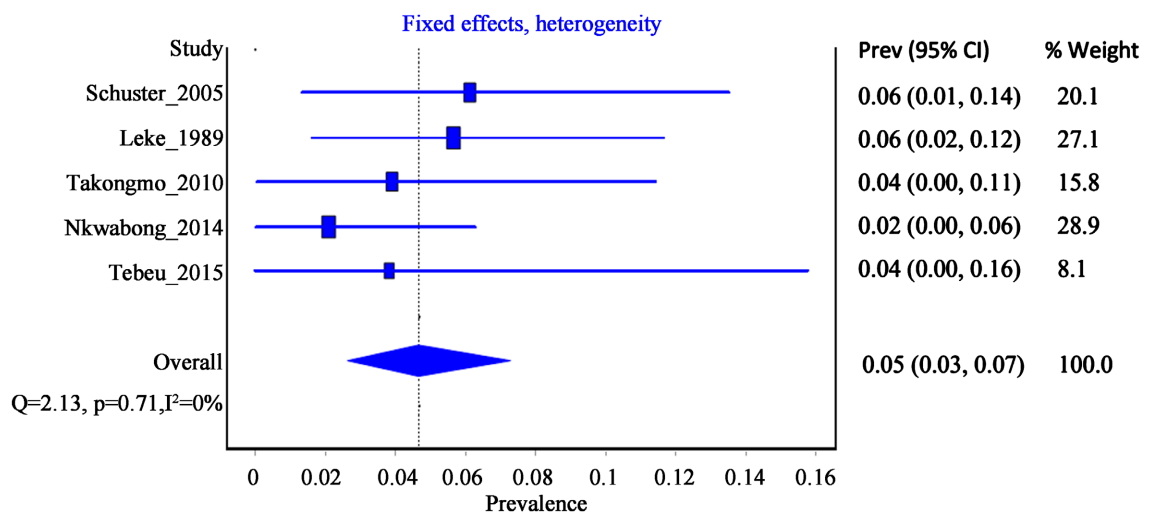
Figure 3. Mortality rate of unsafe abortions.

Figure 4. Frequency of infections associated with unsafe abortions.

3.3.3. Bleeding and Anemia Associated with Unsafe Abortions

Regarding hemorrhages and anemia, 06 studies reported this result.

The percentage of this complication varied between 16% and 70% of cases, with a combined frequency of 40% (95% CI: 18 - 63). The level of heterogeneity across the studies was high, with $I^2 = 99\%$ and $p < 0.05$.

3.3.4. Other Complications

The other complications described in the various studies were incomplete abortions found in 72.8% of patients in one study [30], infertility present in 14.8% of patients with a history of unsafe abortion [21], adnexal lesions (broad ligament hematoma, ovarian injury, etc.) and asthenia.

3.4. Therapeutic Paths of Patients in Order to Benefit from an Abortion

3.4.1. Place of Abortions

The places where abortions are performed were: in the practitioner's or patient's home in 41.4% of cases, in a health center in 35.1% of cases, in a private clinic in 21.2% of cases [26]. The other places listed were: health facilities (private, public, NGOs, etc.) [34], places where medicines are sold [21] [23], clinics for traditional healers [21] [35]. Some articles pointed out that the locations were not clearly defined by the patients, especially in rural areas [31] [34] because the vast majority of abortions in Cameroon take place in secret or under unsafe conditions [30].

3.4.2. Perpetrators of Unsafe Abortions

Data reported on the type of personnel who performed unsafe abortion were scarce and insufficient for a meta-analysis. For the articles that presented this information, the abortion was performed by a nurse or doctor in 25% - 67% of cases [20] [39]. The proportion of abortions performed by a family member or the patient herself varied between 11.8% and 21% [29] [39]. Finally, traditional healers and street drug vendors were responsible for the abortion in 3.9% to 14% of cases [29] [39]. Some patients were self-medicating themselves.

3.5. Difficulties Encountered by Patients in Accessing a Safe Abortion in Cameroon

Most of the abortions in Cameroon take place in secret or under unsafe conditions [30]. Difficulties encountered by patients in obtaining a safe abortion were: fear of legal consequences and strong social stigma [30], lack of specialized services for high-risk groups: adolescents, unmarried women and individuals, displaced persons wishing to have an abortion [33] [35], the non-integration of emergency and family planning services [33], false rumors about the complications of the different methods of family planning in post abortion [33] and restrictive laws of abortion in Cameroon [33].

3.6. Difficulties Encountered by Other Stakeholders in the Abortion Care

The stigma surrounding abortion at the individual, community, organizational and political levels also affect health care providers. It promotes the underreporting and/or falsification of abortions performed even within the legal framework. This is compounded by legal restrictions. This leads to a deep reluctance to defend advocacy for access to safe abortion services [34].

Even within the legal framework, additional legal requirements in the form of various required consents, established deadlines or procedures for obtaining authorization constitute obstacles to access to abortion.

Lack of awareness and misinformation about existing legal frameworks among health care providers and the population hamper the supply and demand for services.

The available guidelines are not updated, well disseminated or used in practice.

The willingness and effort of policy makers to provide technical guidance and facilitate implementation depends on current powers, which means that the level of functioning of ministries may change according to political mandates.

Sensitivity also affects terminology. Some members of learned societies, even those of SOGOC, prefer less sensitive terminology than "safe abortion", such as "comprehensive abortion care (CAC)" or "prevention of unsafe abortion".

Abortion services are often provided by private clinics and NGOs. In the public sector, the provision of safe abortions is limited and therefore, according to key stakeholders, it is difficult to hold facilities accountable for services that should be provided according to the law. It is often unclear who provides the services and a good referral network is generally lacking, especially in rural areas.

Official or informal charges for services limited access [30]. These barriers to accessing safe services often lead to unsafe practices resulting in increased maternal morbidity and mortality.

Within learned societies, there is a diversity of opinions on abortion. Strong opponents of safe abortion seem unlikely to change their position. However, discussions within the workshops showed that opinions were often more nuanced and dynamic. A Cameroonian gynecologist saw the need of women as common ground.

Providers often feel entitled to opt out of abortion care or advise the patient not to have an abortion, but are unaware or do not recognize the ethical obligation to refer when a patient needs services, or provide timely care when the delay would endanger a patient's health. In general, knowledge of the international declaration on conscientious objection is limited [40].

4. Discussion

Out of a total of 430 articles identified, 28 articles were included for data analysis (Figure 1), that's 18 for the quantitative part, 4 for the qualitative part and 6 for

both parts. About a quarter of maternal deaths are linked to an unsafe abortion (Figure 2). Compared to the maternal mortality rate presented in DHS-MICS 2018 [5], this represents approximately 95 deaths per 100,000 live births. This proportion is higher than that reported by WHO. Indeed, according to a systematic analysis of the causes of maternal death worldwide carried out by WHO in 2014, 4.7% - 13.2% of maternal deaths were linked to unsafe abortions [7]. This difference could be explained by the high number of unsafe abortions performed in low- and middle-income countries like Cameroon, but also the conditions under which these abortions are performed. Between 2010 and 2014, 45% of all abortions worldwide were unsafe. Almost all of these unsafe abortions were performed in developing countries, and one in three abortions were performed under the safest and most unsafe conditions [6].

The combined mortality rate from unsafe abortions was 5% (Figure 3), or 5000 deaths per 100,000 abortions. The maternal mortality rate in Cameroon was 406 deaths per 100,000 live births in 2018 [5]. This shows that unsafe abortions significantly contribute to maternal mortality in Cameroon. Likewise, we observe that the risk of death is multiplied by about 10 each time a pregnancy results in an unsafe abortion in our country. This increased mortality could be explained by the precarious conditions in which the abortion is performed, by the lack of qualification of the personnel performing these abortions, and the absence of asepsis linked to the environment where the abortion is performed. This increases the risk of infection and bleeding following abortions, which can lead to the death of the patient.

The most common complication after unsafe abortions was heavy bleeding and/or anemia (related to this bleeding) (Figure 4). It occurred in about 40% of abortion cases. This rate is higher than the proportion of postpartum hemorrhages of 4.1% found by Tebeu *et al.* in a series of 10,302 recent deliveries at the Yaoundé University Teaching Hospital [41]. For example, unsafe abortions increase the risk of pregnancy-related heavy bleeding by about 10 times.

Infection was found in 17% of cases and increased to 42% in one study [42]. The main infections were pelvic infections, pelviperitonitis, septic shock which could lead to death (Figure 5). These infections spread contiguously. In fact, most of these infections were associated with uterine perforation secondary to the procedure performed. The material used during these abortions could explain the high prevalence and severity of the infections described. One case report described the presence of a cassava stalk in the uterus following an unsafe abortion, while another described the presence of a plastic catheter (an infuser intended in principle for the insertion of venous lines) in the peritoneal cavity following an abortion. Likewise, the place where the abortion is performed would also explain this high prevalence of infections, as 41% of cases were performed in a private home.

Other reported complications include incarceration and/or necrosis of surrounding organs, including the intestines. Numerous cases of intestinal obstruction have been reported. All of these conditions represent surgical emergencies,
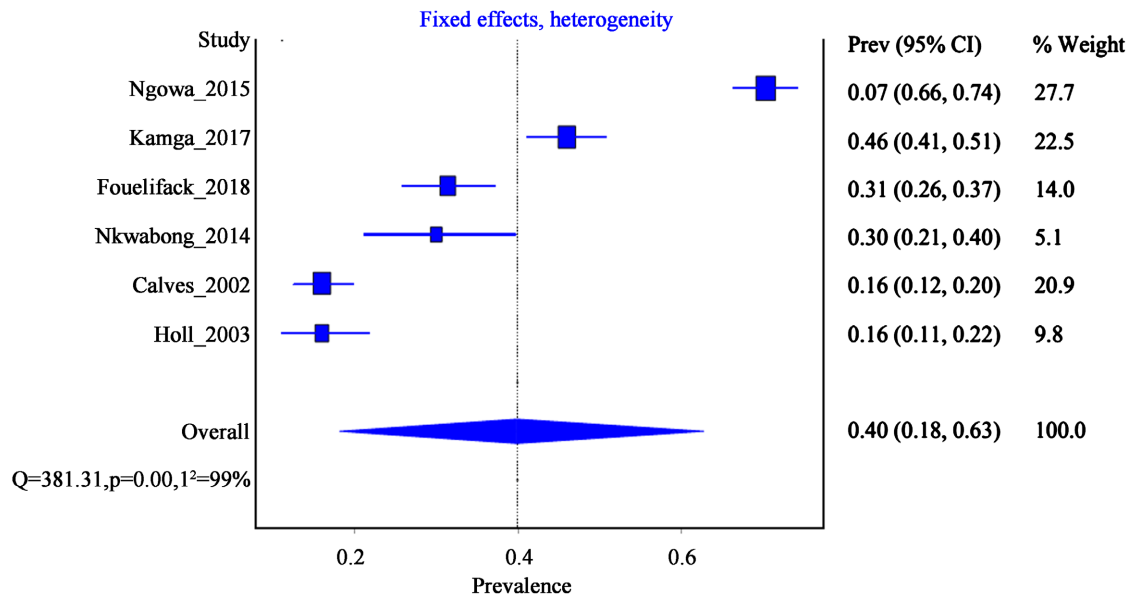
Figure 5. Frequency of bleeding and anemia associated with unsafe abortions.

and could contribute to increasing maternal mortality.

In South Africa, where the expansion of the abortion law entered into force in 1997, the number of women who died from abortion complications fell by 90% over a seven-year period [43]. Cameroon is one of the 52 African countries that have signed or ratified the Maputo Protocol [44] [45]. However, this protocol does not seem to have been clearly incorporated into the Cameroonian penal code, and consequently the law on abortions remains very restrictive, represented by articles 337 and 339 [46]. This restriction would not prevent women from having an abortion, but would make abortions riskier with all the consequences that follow. Thus, to ensure that women have access to safe legal procedures, free from shame, stigma and risks, it would be preferable to harmonize the national legal framework to be in compliance with Article 14, paragraph 2, point c, of the Maputo Protocol [45].

In societies, there is also a need for a more in-depth discussion of how to balance personal values and beliefs with professional obligations.

The main limitation of this review is the low number of articles that meet the eligibility criteria (**Figure 1**). This testifies to the scarcity of studies published on this question in Cameroon, the majority of abortions in Cameroon taking place in secret [30]. In addition, most of the studies conducted were done in urban areas, and in the Centre Region for nearly three quarters of the studies. Thus, the results obtained may not be representative of the entire Cameroonian population. Other limitations include the strong heterogeneity found for certain results (**Figure 4** and **Figure 5**). The risk of article selection bias was reduced by using health professionals for selection.

5. Conclusion

The high morbidity and mortality associated with unsafe abortions, the thera-

peutic paths of patients seeking an abortion and the many difficulties encountered by stakeholders involved in the management of abortions, even in eligible cases, require appropriate measures. Virtually, all death and disability due to abortions could be prevented through sex education, the use of effective contraception, legal access to safe induced abortion, and timely care in case of failure or complications. Thus, we suggest an intensification of provider behavior change communication, family planning, the de-stigmatization of abortions, the application of the Maputo protocol in particular in its article 14, and the training of health personnel in the management would contribute to the reduction in morbidity and mortality linked to abortions. We believe that for more efficiency, a concerted multidisciplinary and multicentric action would be essential.

Authors Contributions

Fouelifack designed the study, Mosman extracted the quantitative data, wrote and translated the manuscript into English. Manewoun extracted the data, analyzed and proofread the manuscript, extracted quantitative and qualitative data, analyzed and wrote the manuscript. Saha Lontsi extracted the quantitative data, Mvong Goretti extracted the qualitative data. Wafeu, extracted data, analyzed and wrote the manuscript. Nsen wrote and proofread the manuscript. Mbu designed the study and supervised all the research process.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Organisation Mondiale de la Santé (2013) Avortement sécurisé: Directives techniques et stratégiques à l'intention des systèmes de santé. Report No. 2. Organisation Mondiale de la Santé, Genève, 146.

[2] World Health Organization (2019) Maternal Mortality.
https://www.who.int/news-room/fact-sheets/detail/maternal-mortality

[3] World Health Organization (2019) Trends in Maternal Mortality 2000 to 2017: Estimates by WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division. World Health Organization, Geneva, 104.

[4] Institut National de la Statistique (INS) and ICF International (2012) Enquête Démographique et de Santé et à Indicateurs Multiples (EDS-MICS) du Cameroun 2011. INS et ICF International, Calverton.

[5] Institut National de la Statistique (INS) and ICF International (2020) Enquête

Démographique et de Santé du Cameroun 2018. Cameroun et Rockville, INS et ICF, Yaoundé.

[6] World Health Organization (2021) Abortion.
https://www.who.int/news-room/fact-sheets/detail/preventing-unsafe-abortion

[7] Say, L., Chou, D., Gemmill, A., Tunçalp, Ö., Moller, A.-B., Daniels, J., *et al.* (2014) Global Causes of Maternal Death: A WHO Systematic Analysis. *The Lancet Global Health*, **2**, e323-e333. https://doi.org/10.1016/S2214-109X(14)70227-X

[8] World Health Organization (2015) Annual Technical Report 2015: Department of Reproductive Health and Research; Special Programme of Research, Development and Research Training in Human Reproduction. World Health Organization, Geneva, 256.

[9] Grimes, D.A., Benson, J., Singh, S., Romero, M., Ganatra, B., Okonofua, F.E., *et al.* (2006) Unsafe Abortion: The Preventable Pandemic. *Lancet*, **368**, 1908-1919. https://doi.org/10.1016/S0140-6736(06)69481-6

[10] Brookman-Amissah, E. and Moyo, J.B. (2004) Abortion Law Reform in Sub-Saharan Africa: No Turning Back. *Reproductive Health Matters*, **12**, 227-234. https://doi.org/10.1016/S0968-8080(04)24026-5

[11] Tebeu, P.-M., Halle-Ekane, G., Da Itambi, M., Enow Mbu, R., Mawamba, M. and Fomulu, J.N. (2015) Maternal Mortality in Cameroon: A University Teaching Hospital Report. *Pan African Medical Journal*, **21**, Article 16.

[12] Les Objectifs de développement durable. Développement Durable. https://www.un.org/sustainabledevelopment/fr/objectifs-de-developpement-durable/

[13] Ouzzani, M., Hammady, H., Fedorowicz, Z. and Elmagarmid, A. (2016) Rayyan—A Web and Mobile App for Systematic Reviews. *Systematic Reviews*, **5**, Article No. 210. https://doi.org/10.1186/s13643-016-0384-4

[14] Page, M.J., McKenzie, J.E., Bossuyt, P.M., Boutron, I., Hoffmann, T.C., Mulrow, C.D., *et al.* (2021) The PRISMA 2020 Statement: An Updated Guideline for Reporting Systematic Reviews. *PLOS Medicine*, **18**, e1003583. https://doi.org/10.1371/journal.pmed.1003583

[15] Mindjah, Y.A., Essiben, F., Foumane, P., Dohbit, J. and Mboundou, E.T. (2018) Risk Factors for Ectopic Pregnancy in a Population of Cameroonian Women: A Case-Control Study. *PLOS ONE*, **13**, e0207699. https://doi.org/10.1371/journal.pone.0207699

[16] Foumane, P., Dohbit, J.S., Ngo Um Meka, E., Nkada, M.N., Ze Minkande, J. and Mboudou, E.T. (2015) Etiologies de la mortalité maternelle à l'Hôpital Gynéco-Obstétrique et Pédiatrique de Yaoundé: Une série de 58 décès. *Health Sciences and Disease*, **16**, 483.

[17] Leke, R.J.I. and Nana, P.N. (2012) Abortions in Low Resource Countries. In: Darwish, A., Ed., *Basic Gynecology-Some Related Issues*, IntechOpen, London, 125-138.

[18] Andre, N., Juliette, N., Joel, F and Brigitte, W. (2017) Incidental Laparoscopic Discovery of an Intraperitoneal Plastic Catheter 16 Years after an Unsafe Abortion: A Case Report from the Gynecologic, Obstetric, and Pediatric Hospital of Yaoundé (Cameroon). *Case Reports in Obstetrics and Gynecology*, **2017**, Article ID: 7130479. https://doi.org/10.1155/2017/7130479

[19] Tchuenkam, L.W., Mbonda, A.N., Tochie, J.N., Mbem-Ngos, P.P., Noah-Ndzie, H.G., *et al.* (2021) Transvaginal Strangulated Bowel Evisceration through Uterine Perforation due to Unsafe Abortion: A Case Report and Literature Review. *BMC Women's Health*, **21**, Article No. 98. https://doi.org/10.1186/s12905-021-01247-y

[20] Schuster, S. (2010) Women's Experiences of the Abortion Law in Cameroon: "What

Really Matters". *Reproductive Health Matters*, **18**, 137-144.
https://doi.org/10.1016/S0968-8080(10)35503-0

[21] Ngowa, J.D.K., Neng, H.T., Domgue, J.F., Nsahlai, C.J and Kasia, J.M. (2015) Voluntary Induced Abortion in Cameroon: Prevalence, Reasons, and Complications. *Open Journal of Obstetrics and Gynecology*, **5**, 475-480.
https://doi.org/10.4236/ojog.2015.59069

[22] Priso, E.B., Nana, N.T., Mboudou, E. and Doh, A.S. (2013) L'avortement Provoqué: A Propos de 3 Cas Compliqués. *Health Sciences and Disease*, **11**.

[23] Nouhjah, S., Zamani-Alavijeh, F., Heydarabadi, A.B. and Hozaili, M. (2017) Which Outcomes Do Women Expect to Achieve after Undergoing Induced Abortion? *Electron Physician*, **9**, 3741-3750. https://doi.org/10.19082/3741

[24] Schuster, S. (2005) Abortion in the Moral World of the Cameroon Grassfields. *Reproductive Health Matters*, **13**, 130-138.
https://doi.org/10.1016/S0968-8080(05)26216-X

[25] Weledji, E.P. and Elong, F. (2013) Small Bowel Obstruction and Perforation Attributed to Tubo-Ovarian Abscess Following "D" and "C". *World Journal of Emergency Surgery*, **8**, Article No. 41. https://doi.org/10.1186/1749-7922-8-41

[26] Nkwabong, E., Bechem, E. and Fomulu, J.N. (2014) Clandestine Abortions in Cameroon: Risk Factors for Severe Complications. *Bangladesh Journal of Obstetrics & Gynaecology*, **29**, 21-25. https://doi.org/10.3329/bjog.v29i1.30439

[27] Mbuwir, C.B. and Essimien, E.B.A. (2019) Abortion Practices among Women in Buea: A Socio-Legal Investigation. *The Pan African Medical Journal*, **32**, Article 146. https://doi.org/10.11604/pamj.2019.32.146.17732

[28] Thomas, O.E., Fidelia, M.K., Metogo, M.J. and Eugene B. (2018) Pyosalpinges after Hysterosalpingography in a Patient with Lower Genital Tract Infection and Managed by Laparoscopic Surgery in a Resource Low Tertiary Hospital Case Report and Literature Review. *Fertility Research and Practice*, **4**, Article No. 2.
https://doi.org/10.1186/s40738-018-0047-3

[29] Leke, R.J.I. (1989) Commentary on Unwanted Pregnancy and Abortion Complications in Cameroun. *International Journal of Gynecology & Obstetrics*, **3**, 33-35.
https://doi.org/10.1016/0020-7292(89)90101-X

[30] Ymele, F.F., Sone, C.E., Nana, P.N. and Fouedjio, J.H. (2018) Cost and Economic Consequences of Unsafe Abortion in the Yaoundé Central Hospital. *Health Sciences and Disease*, **19**, 71-76.

[31] Takongmo, S., Nkwabong, E., Pisoh-Tanggnyin, C., Simeu, C., Ndi, R. and Fouda, B.F. (2010) Complications Chirurgicales des Avortements Clandestins: À Propos de 51 Cas Observés dans Deux Hôpitaux de Yaoundé. *Clinics in Mother and Child Health*, **7**, Article ID: C101927. https://doi.org/10.4303/cmch/C101927

[32] Ngo Mayack, J.L. (2017) Le recours à la contraception d'urgence au Cameroun: le cas de la ville de Yaoundé. Université catholique de Louvain, Ottignies-Louvain-la-Neuve.

[33] Leke, R.J.I. (2018) Reducing Maternal Mortality through the Prevention of Unsafe Abortion and Their Complications in Cameroon. *International Journal of Gynecology & Clinical Practices*, **5**, Article No. 144.
https://doi.org/10.15344/2394-4986/2018/144

[34] de Vries, I., van Keizerswaard, L.J., Tolboom, B., Bulthuis, S., van der Kwaak, A., Tank, J. and de Koning, K. (2020) Advocating Safe Abortion: Outcomes of a Multi-Country Need Assessment on the Potential Role of National Societies of Obstetrics and Gynecology. *International Journal of Gynecology & Obstetrics*, **148**,

282-289. https://doi.org/10.1002/ijgo.13092

[35] Munakampe, M.N., Zulu, J.M. and Michelo, C. (2018) Contraception and Abortion Knowledge, Attitudes and Practices among Adolescents from Low and Middle-Income Countries: A Systematic Review. *BMC Health Services Research*, **18**, Article No. 909. https://doi.org/10.1186/s12913-018-3722-5

[36] Nkwabong, E., Ourtchingh, C. and Mvondo, T. (2014) An Induced Abortion Complicated by Fallopian Tube Incarceration in the Uterine Cavity. *Journal of Obstetrics and Gynaecology of India*, **64**, 32-33. https://doi.org/10.1007/s13224-013-0443-x

[37] Sama, C.B., Aminde, L.N. and Angwafo, F.F. (2016) Clandestine Abortion Causing Uterine Perforation and Bowel Infarction in a Rural Area: A Case Report and Brief Review. *BMC Research Notes*, **9**, Article No. 98. https://doi.org/10.1186/s13104-016-1926-5

[38] Johnson-Hanks, J. (2002) The Lesser Shame: Abortion among Educated Women in Southern Cameroon. *Social Science & Medicine*, **55**, 1337-1349. https://doi.org/10.1016/S0277-9536(01)00276-3

[39] Hollander, D. (2003) Although Abortion Is Highly Restricted in Cameroon, It Is Not Uncommon among Young Urban Women. *International Family Planning Perspectives*, **29**, 49-50. https://doi.org/10.2307/3181002

[40] Calvès, A.-E. (2002) Abortion Risk and Decisionmaking among Young People in Urban Cameroon. *Studies in Family Planning*, **33**, 249-260. https://doi.org/10.1111/j.1728-4465.2002.00249.x

[41] Tebeu, P.M., Fezeu, L.Y., Ekono, M.R., Kengne Fosso, G., Fouelifack Ymele, F. and Fomulu, J.N. (2013) Postpartum Hemorrhage at Yaoundé University Hospital, Cameroon. *International Journal of Gynecology & Obstetrics*, **121**, 283-284. https://doi.org/10.1016/j.ijgo.2013.01.010

[42] Kamga, D.V.T., Nana, P.N., Fouelifack, F.Y. and Fouedjio, J.H. (2017) Role of Abortion and Ectopic Pregnancies in Maternal Mortality Rate at Three University Hospitals in Yaoundé. *The Pan African Medical Journal*, **27**, Article 248.

[43] Jewkes, R., Rees, H., Dickson, K., Brown, H. and Levin, J. (2005) The Impact of Age on the Epidemiology of Incomplete Abortion in South Africa after Legislative Change. *BJOG: An International Journal of Obstetrics & Gynaecology*, **112**, 355-359. https://doi.org/10.1111/j.1471-0528.2004.00422.x

[44] Fact Sheet. Applying the Maputo Protocol Can Reduce Unsafe Abortions. Population Reference Bureau. https://www.prb.org/wp-content/uploads/2019/12/maputo-protocol-fact-sheet-safe-engage.pdf

[45] African Union (2005) Protocol to the African Charter on Human and People's Rights on the Rights of Women in Africa. Adopted by the 2nd Ordinary Session of the Assembly of the Union. Maputo, Mozambique 11th July 2003. Entry into Force 25th November 2005. https://au.int/sites/default/files/treaties/37077-treaty-charter_on_rights_of_women_in_africa.pdf

[46] Republic of Cameroon. Law No. 2016/007 of 12 July 2016: Relating to the Cameroon Penal Code. https://www.prc.cm/files/eb/b0/f4/3f7da246919f7a1805e3bd0b32a9d0f2.pdf

Appendices. Data Collection Form

Variables	Answers
Name of investigator	
Name of first author	
Title of article or document	
Final decision for article/document	
If excluded, precise reason	
Is this study intended for the quantitative or qualitative component or both?	
Region where the study was conducted (If several, regions, list them separated by a comma)	
Location of the study	
Number of study sites	
Study type	
Number of participants included	
Percentage of hospital abortion	
Percentage of abortion at home	
Percentage abortion in the practitioner's house	
Percentage abortion other location	
Specify other location	
Percentage of abortions done by a gynecologist/other doctor	
Percentage of abortions done by nurse	
Percentage of abortions done by non-treating personnel	
Percentage of abortions done by a family member/friend	
Percentage of abortions done by the patient herself	
Percentage of abortions done by other personnel	
Precise other personnel	
Complication 1	
Percentage complication 1	
Complication 2	
Percentage complication 2	
Complication 3	
Percentage complication 3	
Complication 4	
Percentage complication 4	
Complication 5	
Percentage complication 5	
Percentage of deaths	