

Reasons Women Request for Termination of Pregnancy at a Rural Hospital in Zambia; A Cross Sectional Study at Mansa General Hospital, Mansa District, Zambia

Aubrey Shanzi^{1*} , Brian Chanda Chiluba² , Mabvuto Zulu³ 

¹School of Medicine, Levy Mwanawasa Medical University, Lusaka, Zambia, ²School of Health Sciences, The University of Zambia, Lusaka, Zambia, ⁴Department of Obstetrics and Gynaecology, Mansa General Hospital, Luapula, Zambia

*Corresponding author: aubreyschanzi@yahoo.co.uk

Abstract

To cite: Shanzi A, Chiluba BC, Zulu M., Reasons Women Request for Termination of Pregnancy at a Rural Hospital in Zambia; A Cross Sectional Study at Mansa General Hospital, Mansa District, Zambia. JPRM 2021,3(2): 92-100. doi: 10.21617/jprm2021.3215

Background: Globally, it is estimated that unsafe abortions contribute to 8% of maternal deaths. Sub-Saharan Africa has the highest regional estimate of abortion related mortality at 90 per 100, 000 live births. In Zambia the reasons for the termination of pregnancy is enshrined in the Termination of Pregnancy Act of 1972 which states that an abortion may legally take place if the continuation of the pregnancy involves a risk to the pregnant woman's life, physical or mental health; a risk to the physical or mental health of any existing children; or if there is a substantial risk that the child will be born with birth abnormalities. The Termination of Pregnancy Act further specifies that the pregnant woman's actual or reasonably foreseeable environment may be considered. In this study, we set out to assess the reasons women give when requesting for a termination of pregnancy at Mansa General Hospital of Luapula province of Zambia.

Methods: We carried out a descriptive cross-sectional study of 66 women's medical records who requested termination of pregnancy in 2018 January and 2019 December. The records were retrieved from Mansa General Hospital in Luapula province, Zambia. The case notes and consent forms were used to determine the characteristics and the reasons women requested a termination of pregnancy.

Results: Out of the 66 retrieved records of women who requested a termination of pregnancy from the registry of the hospital, 58 had their request of a termination of pregnancy successfully done and 8 never went further to terminate their pregnancy while 1 of the 66 records had the information missing on whether their request was met or not for a termination of pregnancy. Mean age was 25 (SD 7.3) with a minimum of 13 and maximum of 44. Average gestation age was 7.5 weeks (SD 2.8). Fifty percent (50%) of women had one living child and 32.7% were married. Forty one percent (41%) were in their first pregnancy. Sixty eight percent (68.2%) of patients had secondary education whereas 27.3% had a tertiary education. Median parity was 2. The commonest reason for termination was the need to advance in education (27.5%). The second was poor economic home situation (20.3%). The third was medical reasons (13.0%).

Conclusion: Based on the results of the study, the authors suggest strategies to increase knowledge of abortion rights and services and to improve the quality and accessibility of abortion services in Zambia.

Keywords: Abortion, Termination of pregnancy, Termination of pregnancy Act, Women

INTRODUCTION

Worldwide, unsafe abortions contribute to 8% of maternal deaths and Sub-Saharan Africa has the highest regional estimate of abortion related mortality at 90 per 100, 000 live births [1]. Unsafe abortion remains a major challenge in Zambia despite an abortion law that is considered liberal. Abortion remains among the top five causes of maternal mortality in Zambia whose maternal mortality ratio stands at 213 deaths per 100,000 live births [2]. Despite abortion being legal, access to the service is still difficult for some women in need of the service. Hospital based studies show that 30-50% of acute gynecological admissions are as a result of abortion complications and most being due to unsafe abortion.

In 2008, the Ministry of Health in collaboration with WHO and Ipas Africa Alliance commissioned a strategic assessment into the problem of unsafe abortion in Zambia [3]. One of the main findings was that abortion services were being provided in a vacuum. While the law existed, it did so, on a "stand alone" basis with no clear policy framework for standards and guidelines in implementing services. This led to the development of the 2009 Standards and Guidelines document, of which the Safe Abortion: technical and policy guidance for health systems document is the revised and updated version. The Standards and Guidelines mean that the Ministry of Health can respond to the challenges of unsafe abortion by introducing a holistic approach to Comprehensive Abortion Care [4].

Zambia remains committed to further reducing its maternal mortality ratio to less than 100/100,000 live births as outlined in our National Health Strategic Plan 2017 - 2021. One of the major causes of maternal morbidity and mortality in Zambia is unsafe abortion. In response, the Ministry of Health will be introducing this lifesaving package of care, the Standards and Guidelines for Comprehensive Abortion Care (CAC). These standards and guidelines when implemented adequately and to a large scale will contribute significantly to the reduction of maternal deaths from unsafe abortions, a preventable cause of maternal morbidity and mortality [3,4].

The Ministry of Health in Zambia, while acknowledging the Termination of Pregnancy Act of 1972, is mindful of the many

regional and international agreements it has ratified regarding women's health and rights including the International Conference on Population and Development (ICPD) of 1994, Beijing Platform of Action (1995), and the Maputo Plan of Action (2006), and has put together these standards and guidelines to facilitate translation of policy into action: The Standards and Guidelines for Comprehensive Abortion Care. The department states the document should not be used in isolation but in tandem with other documents, such as the Pregnancy, Childbirth, Postpartum and Newborn Care (PCPNC): A Guide to Essential Practice in Zambia 2016, among others. It is important to note that these standards and guidelines do not imply that abortion is another method for contraception. On the contrary, Family Planning (FP) and Post-Abortion Care (PAC) have been integrated as part of these Comprehensive Abortion Care (CAC) standards and guidelines in the hope that this gives impetus to better health outcomes [4]. Despite the broad grounds under which the Termination of Pregnancy Act of 1972 legalized abortion, safe abortion services are not widely available in Zambia, forcing many women to seek unsafe abortions. Maternal mortality rate is estimated at 213 deaths per 100,000 live births and up to 30% of maternal deaths are due to unsafe abortions [5].

One of the studies in Zambia states that the country has had laws that facilitate access to safe abortion for various indications for a long time, however, unsafe abortion still remains common and still causes significant maternal morbidity and mortality. In Zambia, the unsafe abortion-related near-miss rate is estimated at 72 per 100,000 women, and the near-miss ratio is around 450 per 100,000 live births. Further, this study in Zambia reports that thirty (30%) of the maternal mortalities were attributed to unsafe abortions [5,6].

It is clear therefore that even though safe abortion has been legal in Zambia since 1972 many women still face logistical, financial, social, and legal obstacles to access safe abortion services and hence opt for unsafe abortion [6,7]. In addition to the general obstacle's women face, there are huge urban-rural disparities in accessing abortion care services. Comprehensive post abortion care services (CAC) are virtually unavailable in

some rural populations [7]. Part of the reasons for this unavailability, is the lack of medical officers who are essential for this service to be provided. Rural communities also lack knowledge of the availability of these services and of the law. Fear of being stigmatized and religious beliefs are also a barrier to access CAC services [7]. Despite these difficulties encountered in accessing safe termination of pregnancy, especially in rural settings, a handful of women navigate barriers to attempt access to safe termination of pregnancy. There is no study in Zambia rural set up that has tried to investigate the profile of these women and the reasons they come openly to hospitals to request termination of pregnancy.

This study demonstrates the profile of women accessing safe abortion services in rural Zambia and the reasons they request for termination of pregnancy and at the same time the study compares profiles and reasons given for termination in urban setups.

METHODS AND MATERIALS

We carried out a retrospective record review over a period of 24 months (January 2018 to December 2019) from Mansa General Hospital in Mansa District, Luapula province of Zambia. Mansa district has an estimated population of about 200 000 people. The community in Mansa district of Luapula is traditional, conservative and mostly Christian. Participants were records of women who attended the obstetrics and gynecology outpatient department at Mansa General Hospital and had requested for a

termination of pregnancy. Permission to utilize the files for the study was gotten from the hospital management while ethical approval for the study was obtained from the University of Zambia, School of Health Science Research Ethics Committee with protocol ID number 20203101010. We reviewed reasons that women gave for their termination of pregnancy from the hospital records for the period under review. Demographic and clinic profiles of women who underwent a termination of pregnancy was also collected.

RESULTS

Sixty-six (66) women visited the outpatient department requesting for a termination of pregnancy between January 2018 and December 2019. The average age of the women who sought the service was 25 (SD 7.3) years with a minimum of 13 and maximum of 44. Average gestation age of the pregnancy was 7.5 weeks (SD 2.8), ranging from 4-18 weeks. Fifty per cent (50%) of women requesting termination of a pregnancy had at least one living child and 32.7% were married. Fifty percent (50%) of clients requesting termination were doing termination on their first pregnancy. Sixty-eight per cent (68.2%) of patients had secondary education whereas 27.3% had a tertiary education. The median parity and gravidity were 2 and 3 respectively. The demographic and clinical profile of women seeking a termination of pregnancy at Mansa General Hospital, in Zambia is shown in Table 1.

Table 1: Demographic Characteristics of women requesting for termination of pregnancy at Mansa General Hospital, Zambia

Variables	Number(N)	Percentage (%)
(Age)		
<16	3	4.5
17-19	11	16.7
20-24	19	28.8
>24	33	50.0
(Parity)		
0	33	50
1	11	16.7
2	5	7.6
3	3	4.5
4	10	15.2
>4	4	6.0
(Marital status)		
Single	35	53.0
Married	17	25.8
unknown	14	21.2
(gestation age)		
<7	21	31.8
7-9	33	50.0
10-12	8	12.1
>12	4	6.1
(Education status)		
Primary	1	1.5
Secondary	15	22.7
Tertiary	6	9.1
unknown	44	66.7

Mean age differences of termination of pregnancy

Figure 1 shows that from the records observed, 8 women did not terminate their pregnancy, while 57 women terminated their pregnancy. One file

did not have any information documented on whether they had terminated their pregnancy or not. The mean age for those who terminated their pregnancy was 19 years and for those who terminated their mean age was 26 years old. They were no significant differences in the mean age between those who terminated and those who did not terminate their pregnancy $P=0.9879$.

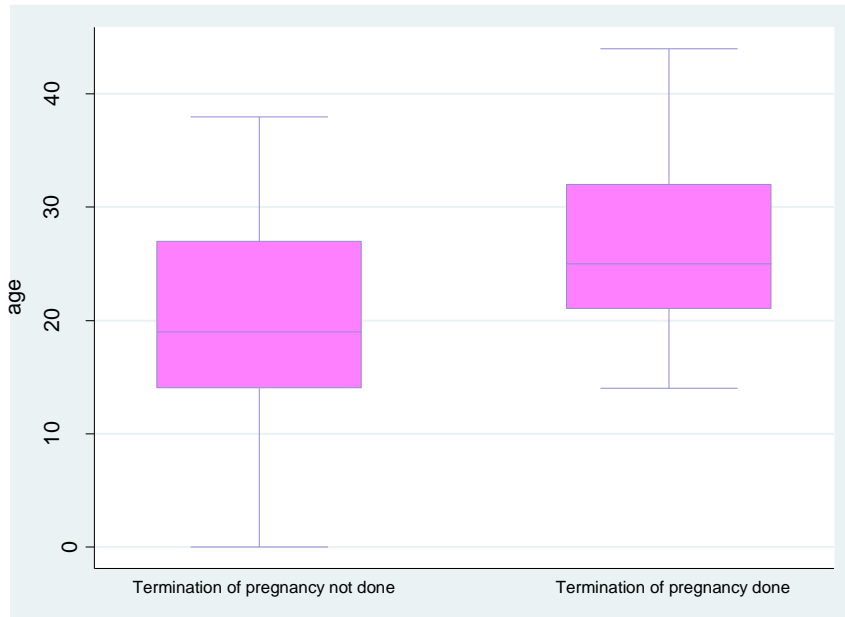


Figure 1: Termination of pregnancy stratified by age

Figure 2 shows the termination of pregnancy and pre-counselling to termination of pregnancy. Overall, 61.2% counselling was done to those who requested a termination of pregnancy, meaning only 38.8 % were not counselled. An estimated 66.7% were not counselled and never went further to terminate their pregnancy,

therefore, 34% of women terminated their pregnancy. On the other hand, 33.3% were counselled and they never went further to terminate their pregnancy, hence only 65% terminated their pregnancy.

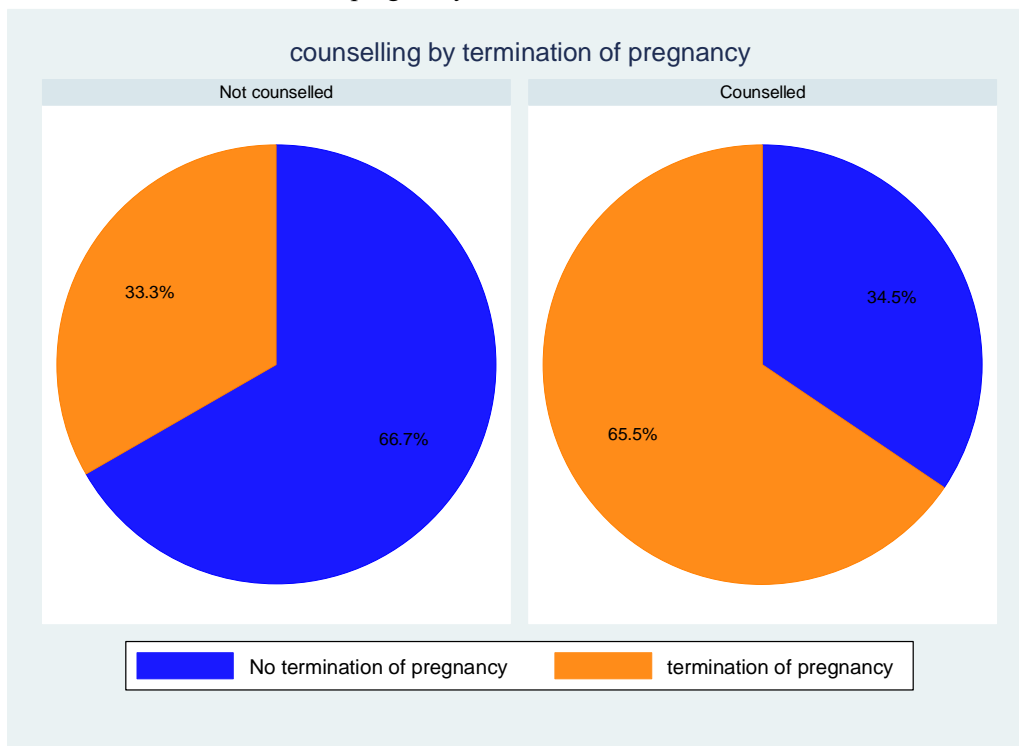


Figure 2: Counselling by termination of pregnancy at Mansa General Hospital, Zambia

Reason for Termination of Pregnancy

The total number of reasons given for termination

from the 66 files was 105. One file did not have any reasons documented for termination. The rest of the files had at least one reason. Five (7.6%) of the participants had more than 2 reasons for requesting termination of pregnancy. The different reasons given for termination of pregnancy were extracted from the patient narrative and developed into themes. These were; medical conditions not allowing the patients to carry the pregnancy (according to patient), financial situation, school situation, traditional beliefs, stigma, loss of support from guardians or parents, failed contraception and lack of support from the sexual partner. The problem of a small baby and still breastfeeding, and high parity were also developed into separate categories. The commonest reason for termination was the need to advance in school. This accounted for 22.9% of the records. These reasons were given by women of school going age for fear of loss of financial support from parent or guardians if pregnancy was discovered. The other issue raised was that the school in which the woman was did not allow pregnant students. The women (22%) gave reasons that school would be difficult to handle together with the pregnancy and hence opted to terminate their pregnancy. The second reason for

termination was based on difficulty financial situation at the home of the woman terminating a pregnancy which accounted for 17.1%. In this category the woman they did not have the financial muscle to support another child. The third reason was that of medical reasons (17.1%). The medical reasons varied, ranging from some women having chronic medical conditions to having bad experiences in their previous pregnancies and hence were not willing to risk labour and delivery in the current pregnancy. Other reasons participants gave were that they chose a termination because of sexual defilement, while others had a termination of a pregnancy due to a recent caesarean section. The fourth reason for termination of pregnancy was stigma (10.5%). The stigma had to do with church affiliations for fear of disappointing one's family. The other reasons given was current breast-feeding and that their babies were still small. This accounted for 7.6 % of the reasons. The above reasons accounted for more than 70 % of the reasons women requested for termination of pregnancy. Table 2 shows a breakdown of details of reasons given by women requesting for termination of pregnancy.

Table 2: Reasons given by women requesting for termination of pregnancy in categories

Category of reasons	List of reasons	Total number of reasons (n)	Percentage out of 105 reason
Medical	Hyperthyroidism=1, Preeclampsia in last pregnancy=2, Diabetic=1, Chronic hypertensive=2, 2 previous caesarean section=2 less than 12/12 difficult labors=1, Heavy bleeding in previous pregnancies=1, failed termination at home=1, Had C-section less than 6/12 ago=1 defilement=2 Traumatic previous labor. Currently with an RVF=1, Mentally challenged =1, Chronic asthmatic=1, chronically unwell unspecified =1	18	17.1%
Financial	financial problems= 18	18	17.1%
School	Pregnancy not allowed in college=3 Pregnancy will impair school progress= 15 withdraw of financial support for School by parent or guardian = 6	24	22.9%
Failed contraception	Failed contraception,	8	7.6%
Problems with parent	Guardian will not support the pregnancy =2 fear of parental wrath=4 dependent =1	7	6.7%
Problems with partner	denied paternity=3, lack of partner support= 5	8	7.6%
Small baby	Very small baby	6	5.7%
Breastfeeding myths	breast feeding harm when pregnant, breast feeding beliefs,	2	1.9%
stigma	Not married yet =1, family stigma=1, church problems=1, divorced=2, shame =1, psychological distress=4,	10	9.5%
High parity	Too many children at home=4	4	3.8%
totals		105	100%

A review of 66 records of women who had requested a TOP at Mansa General Hospital in Zambia was done, 58 of the 66 records were granted the request to have a TOP and 8 did not get a TOP, while 1 individual did not have any information documented on the status of the TOP. Termination of pregnancy remains a difficult social and public health subject across the world. In Zambia, there is general belief that termination of pregnancy is immoral [6]. Despite the social implications of termination of pregnancy, women still seek terminations of pregnancy from different places and different providers for various reasons. In this study, the most common reason advanced for requesting a termination was, related to the advancement of education. This could be attributed to the fact that in Zambia, some schools do not allow pregnant women to continue with their school. The other issue most women feel school will be difficult to handle with the pregnancy; the other reason in the school category was the fear that the girl will lose sponsorship for school once the parent or guardian discovered the pregnancy. Education in the UK study was the third commonest reason (14%) women gave for requesting a termination of pregnancy[7]. It appears that the education system as perceived by women is not conducive for a pregnant woman. In one study, especially for the women in sub-Saharan Africa, where the majority of women who seek abortion tend to be unmarried and young women trade-off between getting an education and caring for a child and it is because the latter may be costly[8].

The other major reason women gave for requesting a termination of pregnancy was financial situation which would be difficult to support a child. This accounted for about 17% of the reasons advanced. Financial reasons accounted for 40% of reasons advanced in a US study and 21% in a UK study [9,7]. The economic situation of women appears to influence the reasons women give for termination. It is important to note that each of these three studies have at least 1/5 women advancing financial situation as a reason to seek termination of pregnancy. The economic muscle to take care of an extra child by women is an important factor in reasons given for requesting termination of pregnancy. This is probably why termination is quiet common when women do not have the support of their partner for the pregnancy [9,10]. Support of both partners for the pregnancy is critical in the decision to seek termination of pregnancy.

Lack of support from partner actually accounted for (7.6%) of the reasons given for

requesting termination of pregnancy in this study. In a US study, lack of partner support accounted for 31% [9]. This is a much higher percentage compared to 7.6% reported in this study. Reasons could be attributed to that the rural setting nature of our study where culture could play a critical role as most of women in the Zambian rural settings do not accompany their partners to the hospital during pregnancy. Furthermore, the perceived lack of support of the pregnancy even by the parents or guardians also played a role as a reason for seeking termination of pregnancy in the Zambian setting. Support of parents did not appear as a reason for requesting termination in both the US and the UK studies. The need for support from parents may be explained by the fact that these women are very young. Twenty-one percent (21%) were less than 19 years old, fifty percent (50 %) were less than 24. Only four percent (4%) were less than 16 years old. Medical reasons also accounted for a large proportion of the reasons for requesting termination of pregnancy as women were chronically ill. Health reasons for termination of pregnancy are more prevalent in Asia and sub-Saharan Africa. This could be because the women in these regions have larger families with close birthing space both of which predispose a women to ill health [8].

Others had bad experiences during delivery of the previous pregnancy and were not willing to go through the same ordeal. Even in the outpatient department women came for termination because of the risks associated with pregnancy. One (1) woman had a fistula after delivery and did not want another pregnancy because her fistula had not been repaired yet. In the UK study contraception failure accounts for 20.5 % of cases[7]. In this rural Zambia study, this reason accounts for only 7.6% of the reasons. The reasons may include that the use of contraceptives in the developed world is higher and hence there is likelihood of contraception failure leading to more reasons for requesting termination of pregnancy. In Africa, contraception failure may be seen as normal leading to patients accepting the situation and not reporting to the health centre.

Our study also reports that more than half of those who requested an abortion underwent a pre abortion counselling process. Our results further shows that counselling did not influence a change or no change of mind for TOP, studies have reported that some reported barriers to access to safe abortion services where abortions are legal include mandatory waiting times and pre-abortion counseling, false information on pre-abortion counseling packages, labeling of safe abortions as not being the right thing to do by

labeling the fetus an unborn child [9,10]. Hoctor and Lamacková have argued that mandatory pre-abortion counseling simply labels an abortion as not the right thing to do, thus reinforcing abortion stigma [11]. The no influence of counselling on TOP in our study could also be attributed to the fact that abortion counseling purposes are to support the woman in deciding for her unintended pregnancy, to help her implement the decision and to assist her in controlling her future fertility. The ideal of counselling is not discourage the women.

Other findings from empirical research indicate that most women do not need a counseling session to obtain an abortion [12,10,13]. In a recent systematic review on the efficacy of pre-abortion counseling in reducing subsequent unwanted pregnancies, Stewart *et al.* did not find any significant effect [14].

Most women in this study were those of secondary and tertiary level education. There was only one woman of primary level education. The level of education of women in rural area is low. Especially in Luapula province where the study took place. Women in Luapula on average only attend 5.6 years of school. Only 8 per cent of women have some secondary and tertiary education [15]. The persons attending termination of pregnancy in this rural hospital seems to have been higher than the average education.

A university teaching hospital study (urban set up) found that women seeking termination of pregnancy had secondary school level or above [16,17] this is very similar to the findings in rural Zambia, though this may not be accurately true as generalization would be difficult due to different cultural settings of rural areas. It appears that the level of education is related to women requesting termination of pregnancy in a hospital set up. Women of all education strata do fall pregnant and also need termination of pregnancy services. It is difficult to ascertain why they are underrepresented in this study. The higher than average level of education in these patients may also explain how early the women came to seek care. The mean gestation period of the 90% of patients that came to the hospital before they reached 11 weeks was 7.7 weeks.

Traditional beliefs in rural areas also play a role in women requesting to terminate pregnancies. The common example is when a woman becomes pregnant when she has a small baby who she is breastfeeding. It is believed that the milk becomes dangerous and women in rural areas stop breastfeeding in fear of the child dying from the “poisonous” milk. Women opt for a

termination so that they can continue breastfeeding, instead of breastfeeding while pregnant. The role of stigma in women deciding to request for termination of pregnancy is huge [18]. One out of every ten reasons given for termination are related to the fear of stigmatization once the pregnancy is discovered. This includes self-stigmatization, church stigmatization and family stigmatisation.

LIMITATIONS OF THE STUDY

One of the limitations of the study is that there was no way of verifying the reasons that women gave for requesting termination of pregnancy. Women may have given reasons that they felt the doctor wanted to hear. This topic is very sensitive and therefore, women may not have given true reasons for termination but the reasons that the medical personnel found palatable. This is however unlikely considering congruency with other studies.

There is also the possibility of selection bias in the sampling because some women coming to the outpatient department may be systematically different from the ones who secretly procure a safe abortion from a doctor within the hospital without entering the hospital records. The data may not be generalized to all women seeking abortion at the hospital and in the community. This study applies only to women who made it to the hospital. Also important to understand that most women in rural areas do not make it to the hospitals when they need a termination of pregnancy. The case notes were not intended to be used for the study, and therefore some information might be missing.

CONCLUSION

There should be deliberate strategies that should be implemented to increase women's autonomy in decision-making and women should be better informed about national abortion laws, the recommended and legal procedures and the location of abortion services. This is important information to women especially as far as reasons for termination of pregnancy is concerned and this is because, the decision may have life-long consequences, compromising the individual health, career, psychological well-being, and social acceptance at times

REFERENCES

1. Coast E, Murray SF. "These things are dangerous": understanding induced abortion trajectories in urban Zambia. *Soc Sci Med.* 2016; 153:201–9.
2. Leone T, Coast E, Parmar D, Vwalika B. The individual level cost of pregnancy termination in Zambia: a comparison of safe and unsafe abortion. *Health Policy Plan.* 2016;31(7):825–33.
3. Guttmacher.org. 2021 [cited 10 May 2021]. Available from: https://www.guttmacher.org/sites/default/files/report_pdf/ib-unsafe-abortion-zambia.pdf
4. GRZ: Termination of Pregnancy Act. 1972.
5. Owolabi OO, Cresswell JA, Vwalika B, Osrin D, Filippi V. Incidence of abortion-related near-miss complications in Zambia: cross-sectional study in central, Copperbelt and Lusaka provinces. *Contraception.* 2017;95(2):167–74.
6. Haaland, Marte E S, Haldis Haukanes, Joseph Mumba Zulu, Karen Marie Moland, Charles Michelo, Margarate Nzala Munakampe, and Astrid Blystad. "Shaping the Abortion Policy – Competing Discourses on the Zambian Termination of Pregnancy Act". 2019. 8: 1–11.7.
7. Bankole, Akinrinola, Susheela Singh, and Taylor Haas. "Reasons Why Women Have Induced Abortions: Evidence from 27 Countries." *International Family Planning Perspectives.* 1998 24 (3). <https://doi.org/10.2307/3038208>.
8. Baron C, Cameron S, Johnstone A. Do women seeking termination of pregnancy need pre-abortion counselling? *J FamPlannReprod Health Care.* 2015 Jul;41(3):181–5.
9. Biggs, M. A., Heather Gould, and Diana Greene Foster. "Understanding Why Women Seek Abortions in the US." *BMC Women's Health.* 2013. 13 (1). <https://doi.org/10.1186/1472-6874-13-29>.
10. Roberts SCM, Turok DK, Belusa E, Combellick S, Upadhyay UD. Utah's 72-Hour Waiting Period for Abortion: Experiences Among a Clinic-Based Sample of Women. *Perspect Sex Reprod Health.* 2016 Dec;48(4):179–87.
11. Hocter L, Lamacková A. Mandatory waiting periods and biased abortion counseling in Central and Eastern Europe. *Int J Gynaecol Obstet.* 2017 Nov;139(2):253–8
12. Ralph LJ, Foster DG, Kimport K, Turok D, Roberts SCM. Measuring decisional certainty among women seeking abortion. *Contraception.* 2017 Mar;95(3):269–78.
13. Guttmacher Institute. Mandatory counseling for abortion. 2016. Accessed 2021 May 10.
14. Stewart H, McCall SJ, McPherson C, Towers LC, Lloyd B, Fletcher J, et al. Effectiveness of peri-abortion counselling in preventing subsequent unplanned pregnancy: a systematic review of randomised controlled trials. *J Fam Plann Reprod Health Care.* 2016 Jan;42(1):59–67.
15. Kirkman, Maggie, Heather Rowe, and Doreen Rosenthal. "Reasons Women Give for Abortion: A Review of the Literature," 2009. 365–78. <https://doi.org/10.1007/s00737-009-0084-3>.
16. Survey, Health. 2013. "Zambia."
17. Geary, Cynthia Waszak, Hailemichael Gebreselassie, Paschal Awah, and Erin Pearso. "Attitudes toward Abortion in Zambia." *International Journal of Gynecology and Obstetrics* 118 (SUPPL. 2): 2012.S148–51. [https://doi.org/10.1016/S0020-7292\(12\)60014-9](https://doi.org/10.1016/S0020-7292(12)60014-9).
18. Wokoma, Tonye Telema, Malathi Jampala, Helen Bexhell, Kate A. Guthrie, and Stephen W. Lindow. "Reasons Provided for Requesting a Termination of Pregnancy in the UK." *Journal of Family Planning and Reproductive Health Care.* 2015 41 (3): 186–92. <https://doi.org/10.1136/jfprhc-2013-100745>.