Perinatal mortality trends in Kwekwe District in Midlands Province, Zimbabwe, 2017 - 2020: A Secondary Data Analysis

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ABSTRACT

Introduction: Perinatal mortality comprises of the total number of stillbirths and deaths within the first seven days of life. Kwekwe District reported a 59.92% increase in perinatal deaths from 247 in 2017 to 395 in 2020. This increase has been shadowing the joy of bearing children for many parents. We described the perinatal death trends and determined reasons for high perinatal deaths in Kwekwe District. **Methods:** We conducted a descriptive cross-sectional study using secondary data in Kwekwe District. Key informants were interviewed using guides. We analysed 844 records of perinatal deaths from 1 January 2017 to 31 December 2020. Epi-info was used to generate frequencies, proportions, medians, graphs and p-values. **Results:** The median age of the mothers was 24 years (Q_1= 20; Q_3=31). Perinatal mortality rate (PMR) increased from 28.4 per 1000 births to 35.6 per 1000 births (p=0.038). Most perinatal deaths (75.3%) occurred at Kwekwe General Hospital. Hypertension contributed 59/333 (17.7%) to stillbirths. Birth asphyxia accounted for 210/511 (41.1%) of early neonatal deaths (ENND). First delay contributed 553/844 (62.6%) of the perinatal deaths. Economic challenges resulting in brain drain and lack of essential equipment were mentioned as reasons for the increase in perinatal deaths. **Conclusion:** The increase in perinatal deaths may have resulted from a decrease in the number of emergency and critical services being offered in the district. The harsh economic environment and inadequate resources contributed to the high perinatal deaths. We recommended provision of adequate equipment to health facilities and provision of non-financial benefits to health workers

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Introduction

Perinatal mortality comprises of the total number of stillbirths and deaths within the first seven days of life [1]. The World Health Organization (WHO) defines stillbirth as a baby born with no sign of life at or after 28 weeks of gestation or birth weight of 1000g or more or body length of 35cm or more [2]. Foetuses may die intra utero, before onset of labour, because of pregnancy complications or maternal diseases. Intrauterine death occurs either before onset of labour (antepartum death) or during labour (intrapartum death). Perinatal mortality is the main contributor to infant mortality and is directly associated with maternal mortality [3]. Globally, 40% of infant mortality and 75% of neonatal mortality are occurring in perinatal period [3].

Globally, the average stillbirth rate per 1000 total births declined from 24.7 in 2000 to 18.4 in 2015, and neonatal mortality rate also fell from 37 deaths per 1000 live births in 1990 to 19 in 2016 [4]. Despite the decline in child mortality, perinatal mortality is considerably high in developing countries [5]. These untimely deaths are a major public health problem in many developing countries and have enormous economic, social and health implications for families and society. Although being new-born is not a disease, large numbers of children die soon after birth. Many of them occur in the first four weeks of life (neonatal deaths), and most of those during the first week (early neonatal deaths). For every baby who dies in the first week after birth, another is born dead (foetal deaths or stillbirths). Causes and determinants of neonatal deaths and stillbirths differ from those causing and contributing to post neonatal and child deaths [6].

In 2014, the World Health Assembly endorsed a target of 12 or fewer stillbirths per 1000 births in every country by 2030 [7]. Stillbirth prevention is included within the vision statement of the new Global Strategy for Women´s, Children´s and Adolescents´ Health. WHO´s "100 Core Health Indicators" include the stillbirth rate, and progress has been made towards WHO-led perinatal audit guidelines and tools [7].The World Health Organization 2018 progress report "Reaching every new-born national 2020 milestones", emphasises that there is a need for target setting, particularly to reduce perinatal mortality rates within South Asia and Sub-Sahara Africa. To achieve this goal, a clear knowledge of the distribution of perinatal mortality across Sub-Sahara African countries is essential to inform prioritization of regional initiatives, which focus on encouraging national-level advocacy and effective interventions that strengthen the health system of high burden countries [8].

In Zimbabwe, perinatal deaths are under surveillance and every case is notified. Facilities use perinatal notification forms, which are completed in triplicate to collect data on perinatal deaths. Kwekwe District saw an increase in perinatal deaths from 2017 to 2020, from 247 to 395 (59.92%). To try to reduce the perinatal deaths, user fees were removed at public health facilities in 2018 and training on Helping Babies Breathe (HBB) for Kwekwe District and the Midlands Province healthcare workers was conducted in the same year. Despite removal of user fees and the training of healthcare workers, the perinatal mortality rate kept increasing in Kwekwe District. We analysed perinatal deaths data in Kwekwe District to come up with trends and determine areas that need improvement and strengthening.

Methods

Study design

We conducted a descriptive cross-sectional study using secondary data.

Study setting

The study was conducted in health facilities in Kwekwe District, Midlands Province, Zimbabwe. Kwekwe is one of the eight districts in Midlands Province. The district capital is located approximately 220 kilometres, southwest of Harare. The district serves a total population of 311 556 [9] and has 44 health facilities. Kwekwe District is rich in minerals including gold and iron ore and it contains many large and small mines and several large steel mills.

Study population

We used data collected from mothers who had had perinatal deaths in Kwekwe District from January 2017 to December 2020. We purposively selected four key informants namely the district medical officer (DMO), the district nursing officer (DNO), the district health promotion officer (DHPO), and the medical superintendent at Kwekwe General Hospital.

Data source

Health workers collect the data using the perinatal death notification form when a perinatal death occurs. The objective of the notification information is to inform robust responses to improve quality of care and prevent future deaths. The perinatal death notification form has six major sections, which are details of the mother of the deceased child section, maternal medical conditions section, antenatal care, labour, and delivery section, neonatal deaths section, still births section and delays section. Some of the variables captured in the sections include the age, parity, gravida, level of education, marital status, religious denomination, booking status, pre-existing and pregnancy related conditions, cause of death and also type of delay, that is, first, second and third delay. Three copies are submitted to the health information section for consolidation and onwards transmission to the Ministry of Health and Child Care`s head office in Harare. An individual perinatal death record was the study unit.

Data collection

Perinatal death notification forms were reviewed. We captured the data from the line list we created using the Microsoft Excel software. We ensured data quality of the line list by cross checking the data with that on the notification form. We interviewed key informants using key informant guides to determine the reasons for the high perinatal deaths in the district.

Data analysis
We used Microsoft Office Excel 2019 to generate graphs. Epi Info version 7.2.4.0 software was used to perform chi-square tests for trends of proportions at a significance level of $p<0.05$. Data quality was assessed by checking for completeness of the notification forms. For records with missing information for certain variables, we excluded that record in the analysis of the missing variable. Key themes and quotes on the cause of the high perinatal deaths in the district were identified and reported.

Availability of data and materials
The perinatal deaths data sets that were analysed are available from the corresponding author on reasonable request.

Ethical considerations
Permission to conduct data analysis was sought and obtained from the Health Studies Office (HSO), the DMO of Kwekwe District and Provincial Medical Director (PMD) of Midlands. Since data collection took place during the COVID-19 pandemic, the essential precautions were strictly adhered to by ensuring social distancing between the interviewer and study participants, hand hygiene and wearing masks that adequately covered the nose and mouth. Confidentiality was maintained as the names of the key informants interviewed were not recorded on the key informant guide.
Ethical approval for the study was obtained from Midlands Provincial Medical Directorate, Kwekwe District Medical Officer and Health Studies Office. Since secondary data was used, no personal identifying data was used in the analysis.

Results

Data quality
A total of 1277 perinatal deaths were reported in the District Health Information System 2 (DHIS2) database. However, a total of 867 of the 1277 (67.9%) perinatal death notification records were found of which 844/867 (97.73%) were line-listed and analysed because the forms contained most of the variables completely filled in.

Demographic variables for mothers in perinatal records
The majority of the mothers in perinatal death records 390 (46.2%) were in the 20-29 age group. The median age was 24 years (Q1= 20; Q3=31). Those who had more than 3 children were 191 (22.6%). The majority of mothers, 360/844 (42.7%) were in their second and third pregnancies **Table 1**.

Trends and distribution of perinatal deaths

Perinatal mortality rate trends
Perinatal deaths increased in Kwekwe District from 28.4 per 1000 births in 2017 to 35.6 per 1000 births in 2020. The increase in the perinatal deaths was statistically significant (p=0.04) **Figure 1**.

The early neonatal mortality rate rose from 15.6 deaths per 1000 births in 2017 to 18.4 deaths per 1000 births in 2018. It further rose to 18.7 deaths per 1000 births in 2019 before falling to 15.1 deaths per 1000 births in 2020 (p=0.92). Macerated stillbirths gradually rose from 9.5 per 1000 births in 2017 to 12.7 per 1000 births in 2020 (p=0.06). The change in fresh stillbirths was not statistically significant (p=0.17) **Figure 2**.

The majority of the perinatal deaths 962/1277 (75.3%) occurred at Kwekwe General Hospital. Perinatal deaths rose from 177 perinatal deaths in 2017 to 312 in 2020 at Kwekwe General Hospital **Figure 3**.
The majority causes of stillbirths were unknown 170/333 (51.1%). Hypertension contributed to 59/333 (17.7%) still births that occurred in Kwekwe District between 2017 and 2020. Antepartum hemorrhage contributed the least to still births with 18 deaths. Birth asphyxia contributed the most to early neonatal deaths accounting for 210/511 (41.1%). The cases of birth asphyxia increased during period 2017-2020. Prematurity contributed 168/511 (32.9%) of the early neonatal deaths. The majority of perinatal deaths were among mothers who had no known medical condition 488/844 (57.8%). Hypertension was the most common maternal medical condition with 209/844 (27.8%) of the mothers having the condition.
During period 2017 - 2020, there was an increase in the number of perinatal deaths that were attributed to the first delay. A total of 553/844 (62.6%) of the perinatal deaths occurred due to the first delay **Figure 4**.

Reasons for high perinatal deaths

All the four key informants reported that the high perinatal mortality rate was attributed to the economic challenges being faced by the country. One of the key informants noted that *"with salaries of health care workers being drained by the inflation, many qualified health personnel have relocated to other countries in search of greener pastures and others have left for the private sector affecting service delivery"*. Another key informant said that, *"the macroeconomic environment resulted in patients presenting when it was too late because they would seek medical services when they have exhausted other alternative ways like traditional and religious ways"*. All key informant attributed perinatal deaths to unavailability of resources, two hospitals in the district had stopped offering surgical procedures like caesarean sections as the machines had broken down and had not been repaired. One key informant noted that *"The district has inadequate ambulances which results in patients that need transfer having to rely on own transport, however with the difficult economic environment, only a few can afford"*.

Discussion

We conducted a secondary data analysis for perinatal deaths in Kwekwe District. The major findings from the secondary data analysis were that: the most affected maternal age group was 20-29 years, there was an increase in the perinatal mortality rate from 2017-2020, most mothers who had perinatal deaths had no known medical

conditions, birth asphyxia accounted for most of the early neonatal deaths and first delay was among most perinatal deaths.

There was an increase in the trend of perinatal mortality rates in Kwekwe District. The increase in perinatal deaths may have resulted from a decrease in the number of emergency and critical services being offered in the district. Silobela Hospital, the district hospital was not performing both elective and emergency caesarean sections because of lack of resources to perform the operations. This could explain the high early neonatal deaths observed in the district from 2017 - 2020. The findings were contrary to those found in Nepal where the perinatal mortality rate showed a distinct trend falling from 30.7 per 1000 births to 14.4 per 1000 births between 2002 and 2011 [10]. However, the findings were similar to those of Kuti in Nigeria who found that the perinatal mortality rate during the study period was 77.03 per 1000 total births and there was a steady increase in rate over the study period [11].

We also found out that early neonatal deaths contributed the most to the perinatal deaths in Kwekwe District from 2017-2020. The high early neonatal deaths could have resulted from lack of quality neonatal care as well as lack of large-scale effective interventions such as newborn resuscitation, caesarean section, therapeutic use of surfactant for preterm babies and vacuum and forceps delivery that are targeted at addressing early neonatal deaths. Early neonatal mortality is more related to the health and care condition at and after delivery. These findings show that there is need to invest in the secondary health facilities in Kwekwe District to reduce the early neonatal deaths.

Birth asphyxia is a lack of blood flow or gas exchange to or from the fetus in the period immediately before, during, or after the birth process and can result in profound systemic and neurologic sequelae due to decreased blood flow and/or oxygen to a fetus or infant during the peripartum period [12]. Guidelines for neonatal resuscitation represent a standard practice set that improves outcomes in asphyxiated newborns [13]. The guidelines require that the facilities have trained and experienced staff who have undergone training to successfully resuscitate newborns who require treatment. Kwekwe District has seen a significant number of perinatal deaths being attributed to birth asphyxia. This could have resulted from loss of skilled and experienced staff who are leaving for greener pastures as the economic environment has been difficult. Moreover, lack of resources like oxygen at some facilities could have resulted in some newborns dying from birth asphyxia. Kuti found that the most common cause of perinatal death was asphyxia as it accounted for (55.2%) of the deaths [11]. Manandhar in Nepal also showed that most 41% of the perinatal deaths were attributed to asphyxia and also low birth weight or preterm babies [10].

Hypertensive disorders of pregnancy complicate pregnancy outcomes [14]. For mothers with known medical conditions, we found that most perinatal deaths were among mothers who had hypertension. Hypertensive disorders of pregnancy can result in HELLP (Haemolysis, Elevated Liver Enzymes and Low Platelets) syndrome, placental abruption, perinatal asphyxia, prematurity and low birth weight [15]. These complications can be difficult to manage in resource-limited settings. Kwekwe District was reported to be resource limited by key informants, which could explain the high perinatal mortality due to the complications of hypertensive disorders of pregnancy. Similarly, Gezehagn Endeshaw and Yifru Berhan found that women with hypertensive disorders of pregnancy where nearly three-fourths of babies who died in the perinatal period [16].

Seeking health care services is a major step in preventing and reducing perinatal mortality. Pregnant women should seek medical help when they are pregnant so that potential problems can be identified and can be addressed before they are irreversible. In Kwekwe District, we found that the first delay contributed the most to perinatal deaths from 2017-2020. The delay in seeking help can be attributed to the macroeconomic environment, which has resulted in many seeking alternative sources of help other than health facilities. Despite maternal services being free in Zimbabwe´s public health facilities, most facilities do not have drugs and equipment to help pregnant women hence the hesitancy seeking help earlier. The delay in seeking help will hinder the country from attaining the sustainable development goals in particular goal 3, and lose some gains that had been achieved in reducing perinatal mortality rate.

Limitations

We reviewed 844 (66.1%) of the 1277 notification forms and some of the notification forms were missing which could possibly change the distribution of perinatal deaths by the variables that we looked at.

Conclusion

Our study indicates that perinatal mortality rate has been increasing in Kwekwe District during the period 2017-2020, and the rate is high. Early neonatal deaths contributed the most to the perinatal deaths in Kwekwe District. The harsh economic environment and inadequate resources may have contributed to the high perinatal deaths. There is a strong need to continuously engage the community on seeking care early. There is need to adequately capacitate the district health facilities by equipping them with the requisite medical equipment and consumables so that theatres can work at all hospitals and operate at capacity. We further recommend the provision of non-financial benefits for health workers in the district to help retain critical staff is highly recommended.

Public health actions

- Attended an ANC clinic at Kwekwe General Hospital and gave lessons to mothers on importance of seeking health services early.

- Emphasized the importance of doing a urinalysis at municipal clinics on all women with pregnancy induced hypertension and not just give medication as some may have preeclampsia.

What is known about this topic

- Sub-Saharan Africa has one of the highest levels of perinatal mortality globally

What this study adds

- The study highlighted that the first delay in health seeking contributes to perinatal deaths
- The study highlighted the increase in perinatal deaths in kwekwe district from 2017?2020

Competing interests

The authors declare no competing interests.

Authors' contributions

NCM, MM, NTG, AC, TPJ, and MT: conception, design, and acquisition. NCM, MM, NTG data analysis, and interpretation of data. NCM, MM, NTG, AC, TPJ, and MT wrote the first draft of the manuscript. All authors read and approved the final manuscript for publication.

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Table 1: Demographic variables for mothers in perinatal records, Kwekwe District, 2017 – 2020		
Variable	**Category**	**n =844 (%)**
Age group	Less than 20 years	164 (19.4)
	20 to 29 years	390 (46.2)
	30 to 39 years	254 (30.1)
	40 years and above	36 (4.3)
Median age	24 (Q_1= 20; Q_3=31)	
Gravida	1	304 (36.0)
	2 – 3	360 (42.7)
	≥4	180 (21.3)
Parity	0	266 (31.5)
	1 – 2	387 (45.9)
	≥3	191 (22.6)

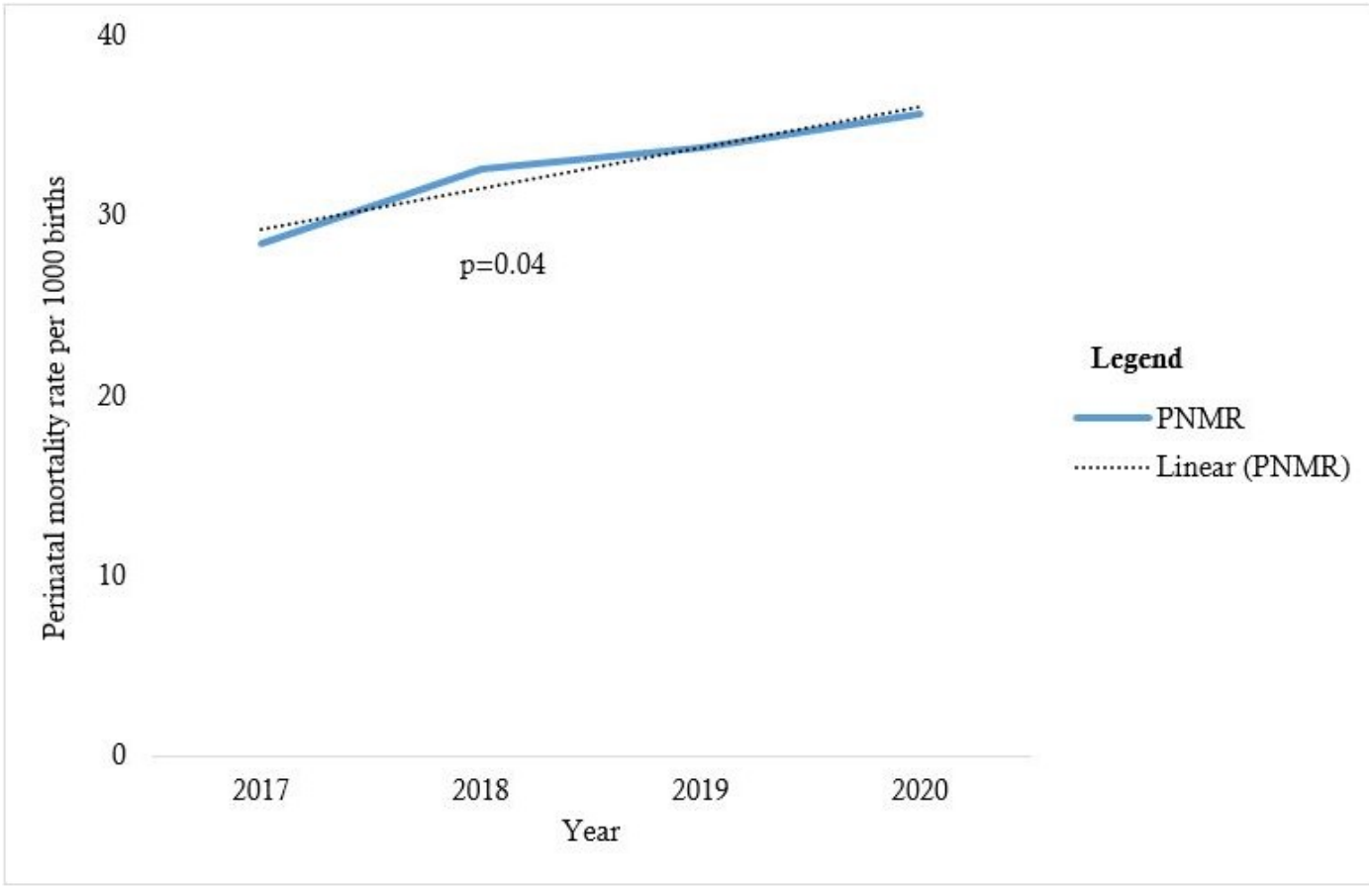

Figure 1: Perinatal mortality rate trends in Kwekwe District, 2017 – 2020

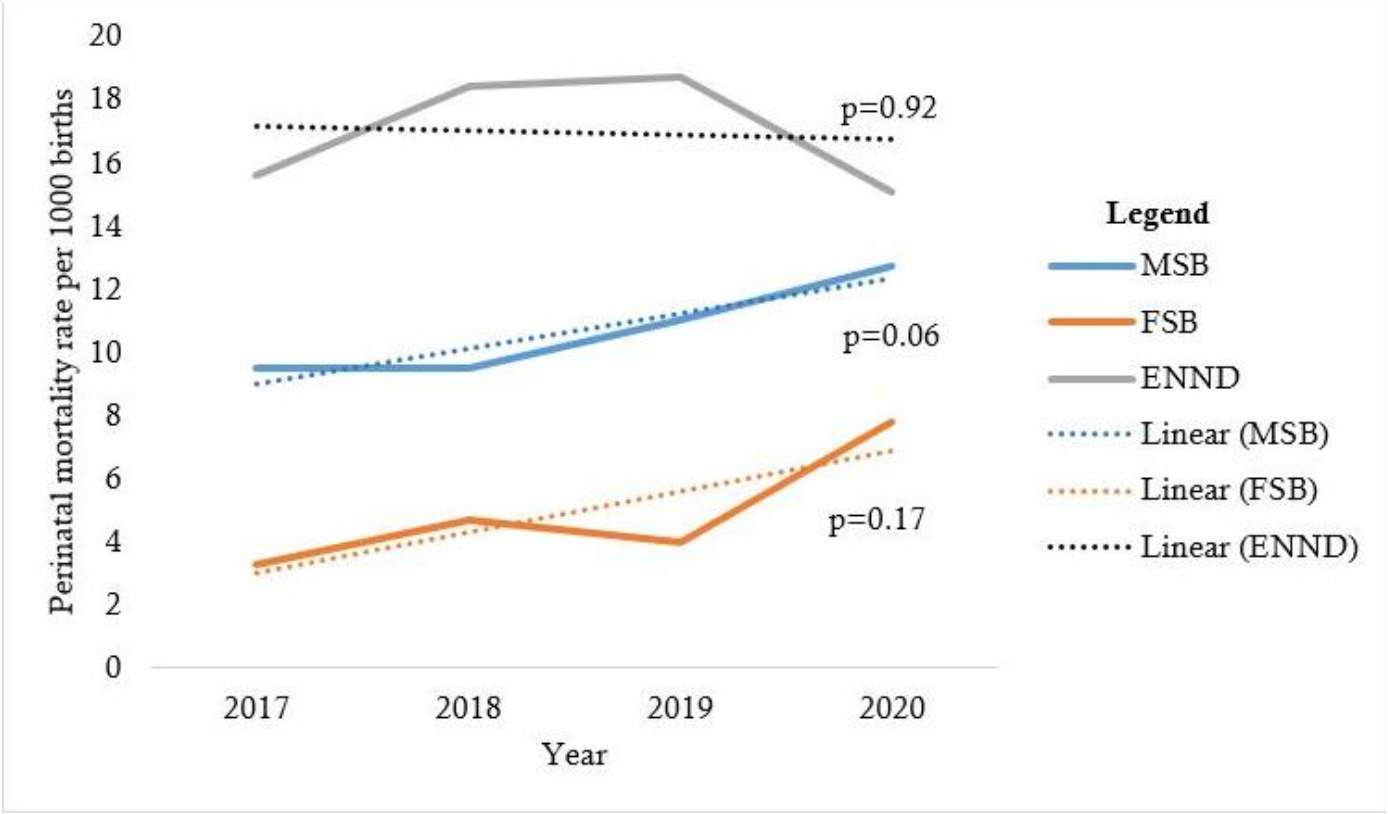

Figure 2: Perinatal mortality rate trends by type in Kwekwe District, 2017 – 2020

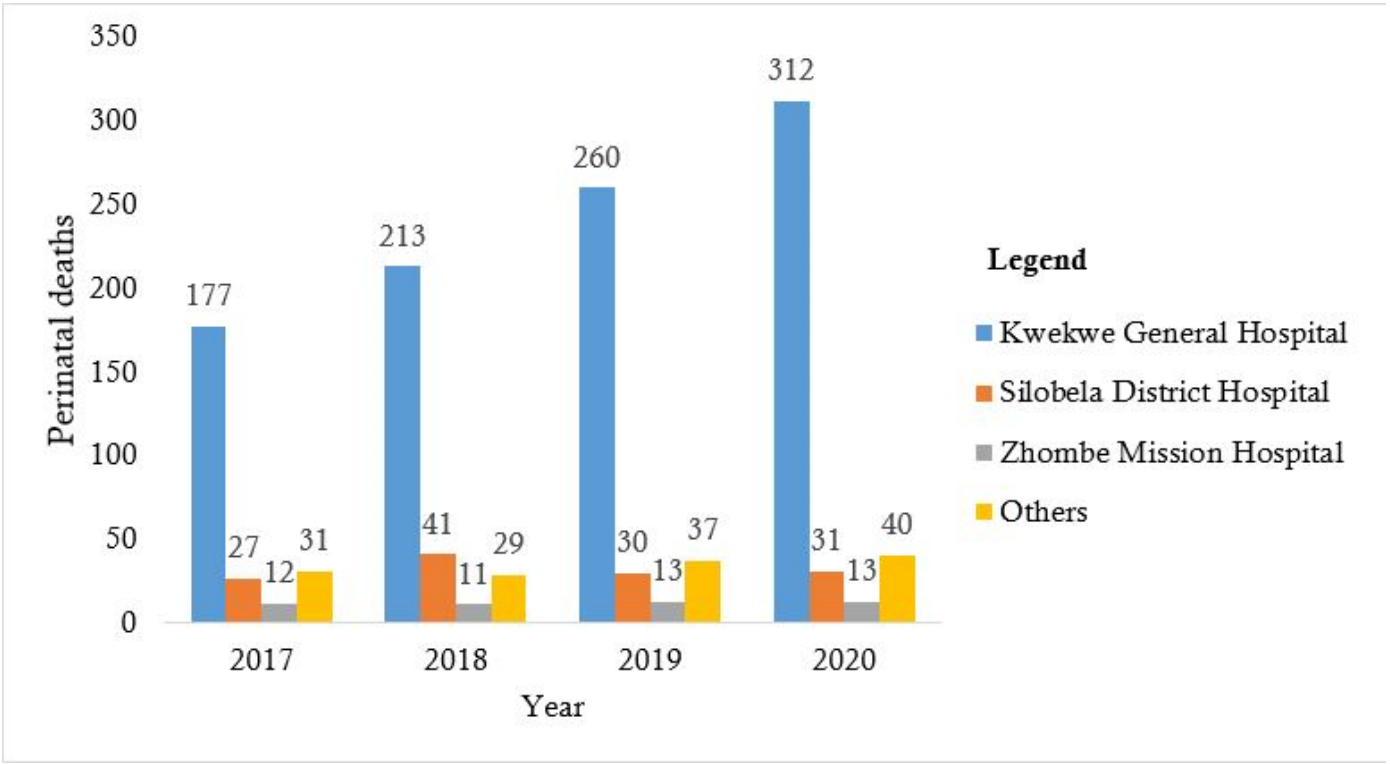

Figure 3: Perinatal deaths by facility in Kwekwe District, 2017 – 2020

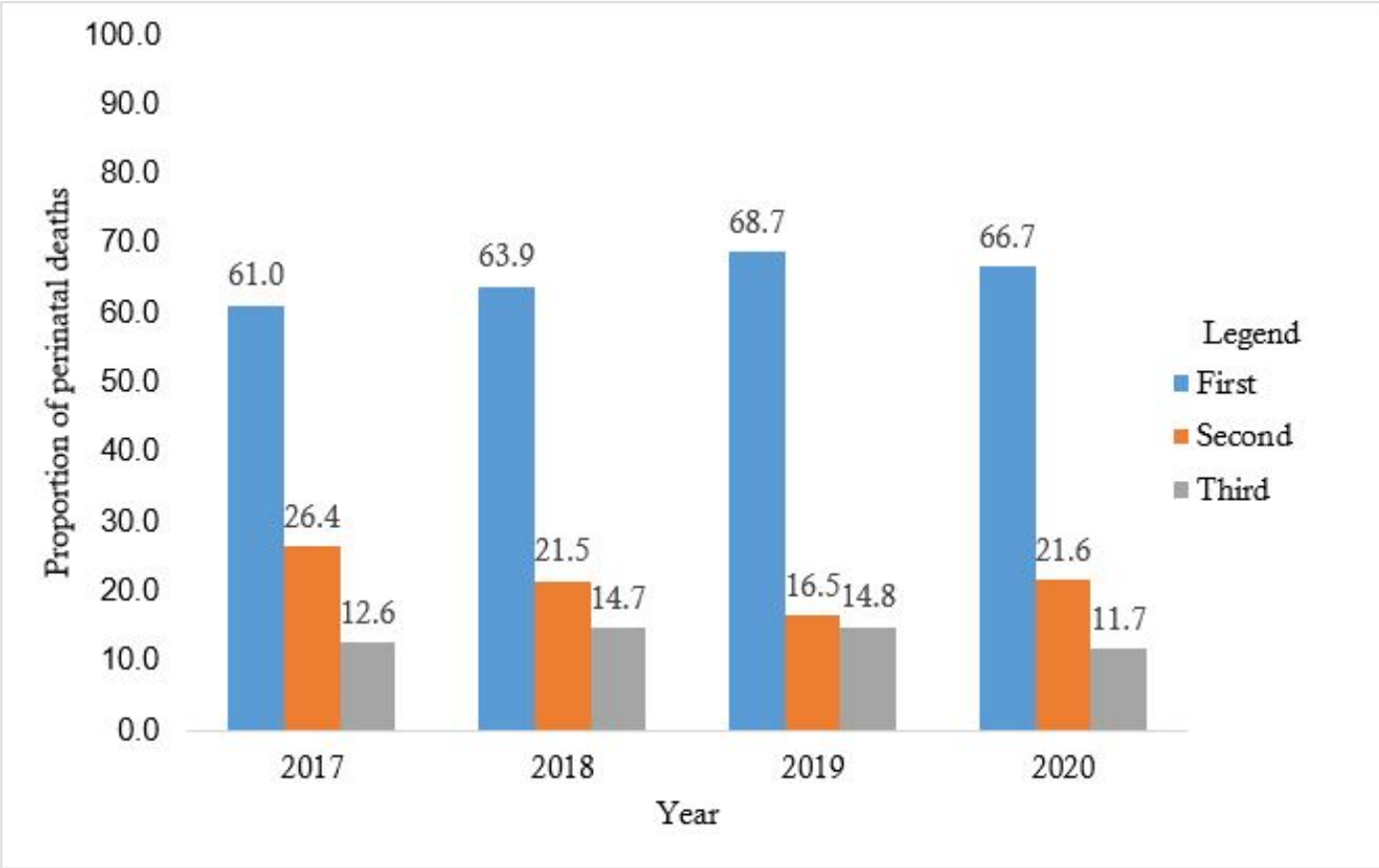

Figure 4: Perinatal deaths trends by delays in Kwekwe District, 2017 – 2020