Deanship of Graduate Studies
Al-Quds University

Documentation Practices of Infants' Death Notification Forms among Pediatric Physicians Working in Governmental Hospitals in the Gaza Strip

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M.Sc. Thesis

Jerusalem- Palestine

1444 / 2023

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A Thesis Submitted in Partial Fulfillment of Requirements
for the Degree of Master of Public Health/Epidemiology
Al- Quds University

1444 / 2023

Al-Quds University

Deanship of Graduate Studies

School of Public Health

Thesis Approval

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Master thesis submitted and accepted. Date: 20/3/2023
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Jerusalem – Palestine

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Dedication

My humble effort is dedicated to my beloved and exceptional parents, who are an endless source of inspiration, continuous support, and encouragement.

Mohamed, Tariq, Yasmeen, Shaima, Souad, Yahiya,Omer and Afnan, my brothers and sisters, for your prayers and support.

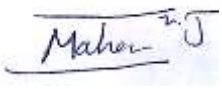
To the light of my eyes, my son (Iyad).

Thank you from the bottom of my heart to everyone who helped make this study a reality.

Declaration

I certify that this thesis submitted to the degree of master is the result of my own research, except where otherwise acknowledged, and that this thesis or any of its parts has not been submitted for higher degree to any other university or institution.

Signature



Maha Zyad Nemer Jarbouh

Acknowledgment

This thesis would not have been possible without Allah, the guidance and assistance of a number of individuals who, in one way or another, contributed to the completion of this study and provided invaluable assistance.

My highest regard and gratitude go to Dr. Mahmoud Radwan for his oversight, direction, assistance, and encouragement in completing this work.

Dr. Bassam Abu Hamad, Dr. Khitam Abu Hamad, and Dr. Yehia Abed deserve special recognition and gratitude for their assistance and patience during my study years and review of my study instruments. Also deserving of gratitude are the specialists who reviewed the research tools and provided insightful feedback.

Without Dr. Sawsan Shurab's participation in the preparation of the third part of the study questionnaire and the revision of all DNFs for the year 2020, this work could not have been finished.

Lastly, I would like to thank my colleagues, the health care facility staff, for their assistance in completing the questionnaires.

Maha Zyad Nemer Jarbouh

Abstract

Background: Complete and accurate Death Notification Forms (DNFs) are a central component indicating a strong mortality statistic. This study aimed to investigate the documentation practices of infants' DNFs among pediatric physicians working in health facilities in the Gaza Strip. **Methods:** This study used retrospective document analysis, cross-sectional descriptive, and mixed sequential explanatory methods. In the first phase, the study employed the quantitative approach among 208 physicians. In which, a self-administered questionnaire was provided to explore the knowledge, attitude, and factors influencing the proper documentation practices of DNFs. In the second phase, DNFs data quality was extracted via a data abstraction sheet developed by the researcher. Eligible DNF (439) for infants aged one year or less were observed and evaluated based on the WHO guidelines. Two highly trained pediatricians extracted the medical data and determined the cause of death, and a third expert was consulted if the two pediatricians disagreed. A qualitative study using in-depth interviews and a semi-structured questionnaire was conducted with ten specialists selected purposively in the third phase. For data analysis, SPSS statistical software was used. **Results:** The findings were reached after collecting data from 208 physicians, and 439 DNFs, and interviewing ten pediatric physicians. Among the 208 physicians, the main age group was from 30 to 55 years which formed 65.3% of the participants and 80.3% were males. The participants' level of knowledge about completing DNFs is 58.5% indicating a knowledge deficit, however, their attitude is 82.8% which is considered positive. In general, most of the physicians (65.26%) conducted at least one major error. Thus, determining the original disease underlying the cause of death was the highest percentage (67.79%) of major errors. Regarding minor errors, there was no DNF free of any minor errors. The most frequently occurring minor error by physicians was using abbreviations and symbols (74.52 %). The three highest ranked barriers affecting completion of infant death notifications were complexity of infant diseases (mean = 4.18), high workload (mean = 3.7), and insufficient training (mean = 3.6). Moreover, total years of experience (p=0.0009), adequacy of the DNF received training (p=0.030), availability of written policies on competing the DNF in the hospital (p= 0.0001), the managerial position of the physicians (p=0.0004), qualifications (p=0.0001), and salary (p=0.0009), were all statistically significant factors affect the level of knowledge positively. On the other hand, working hours per day (p=0.002) affect the level of knowledge negatively. Finally, the name of the working hospital (p=0.0001), was also a statistically significant factor affect the level of knowledge. 15.9% of the analyzed DNFs had inaccurate mechanisms of death, 49.2% had an inappropriate sequence of events leading to death, and 5% had multiple causes of death per line. Regarding the qualitative study, the analysis recognized seven main themes worked as factors influencing the correct completing of the DNFs were: staff training, monitoring and supervision, staff time and workload, managerial commitment, incentives and support, physicians' knowledge and attitude. **Conclusion and recommendations:** The results of the quantitative study came in line with the qualitative one. The physician level of knowledge is poor with positive attitude about the completion of the DNFs. Most of the physicians conducting at least one major error. More training courses, supervisor monitoring, and workshops on how to write DNFs and how to use ICD10 are required. Decrease the work pressure and providing incentives and rewards to physicians who do good documentation are advised.

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List of Abbreviations

AMH	Al-Aqsa Martyrs Hospital
ANOVA	One-Way Analysis of Variance
CoD	Cause of Death
DNFs	Death Notification Forms
EGH	European Gaza Hospital
EHRs	Electronic Health Records
EMRs	Electronic Medical Records
GS	Gaza Strip
ICU	Intensive Care Unit
IMR	Infant Mortality Rate
KAP	Knowledge, attitude, and practices
LMICs	Low- and Middle-Income Countries
MCCD	Medical Certificate of Cause of Death
MLCC	Midwife-led Continuity of Care
MoH	Ministry of Health
NCDs	Noncommunicable Diseases
NGOs	Non-Governmental Organizations
NIS	New Israeli Shekel
NMC	Nasser Medical Complex
PCBS	Palestinian Central Bureau of Statistics
PHCCs	Primary Health Care Centers
SD	Standard Deviation
SMC	Al Shifa Medical Complex
SPSS	Statistical Package for Social Sciences
UNRWA	United Nations Relief and Works Agency for Palestine Refugees in the Near East
WHO	World Health Organization

Chapter One

Introduction

1.1 Introduction

Infant mortality is often used not only as a measure of social and economic development, but also as a health indicator of countries. According to the World Health Organization (WHO), the global infant mortality rate (IMR) has decreased from an estimated rate of 65 deaths per 1000 live births in 1990 to 29 deaths per 1000 live births in 2018 (WHO, 2021).

Complete and accurate Death Notification Forms (DNFs) is a central component indicating a strong vital registration (Mikkelsen et al., 2015). Completing the DNFs with accurate data is a prerequisite for correctly measuring the morbidity and mortality statistics, designing health policies and programs, and conducting public health research (Mathers et al., 2005; Lakkireddy et al., 2004). The DNFs is a permanent legal record that provides important information on the Cause of Death (CoD) (Huffman, 1997). All individual DNFs are aggregated by national registration to form death statistics as a golden data source of mortality data and CoD (Byass, 2007). These statistics are utilized by policy makers, health managers, healthcare providers, donors, researchers on the common CoD. The WHO recommends using the Medical Certificate of Cause of Death (MCCD) which is a standardized international form adopted by its member states. The WHO provides instructions on using the MCCD for correctly reporting the CoD (WHO, 2016). The effective reporting of the death event depends mainly on the ability of the doctor to accurately complete the DNF, the ability of the mortality coders to accurately code the CoD available within the DNFs, and the ability to analyze these codes into national mortality statistics (Cobos Muñoz et al., 2018).

The accuracy of CoD mentioned within the DNFs depends on many factors, including the physicians' knowledge of rightly determine the death sequence, underlying, and direct causes of death (Maudsley & Williams, 1993). Globally, about 50% of the registered deaths are with inaccurate CoD, while most of the Low- and Middle-Income Countries (LMICs) are with incomplete and inaccurate CoD data according to Institute for Health Metrics and Evaluation (IHME, 2018; Adair & Lopez, 2018).

1.2 Research Problem

The quality of national mortality statistics is frequently suboptimal (Rampatige, 2013; Burger et al., 2015). The quality of the DNFs is influenced by many factors such as physicians' knowledge, medical education, and hospital resources (Sibai, 2004). In 2017, a study conducted in the USA hospitals found that 46% of the DNFs were inaccurate (Lloyd, et al, 2017). About 24% of the DNFs in South Africa were reposted as unknown or ill-defined CoD (Burger et al., 2015). In a study aimed at assessing the quality of DNFs in West Bank found that only 1% of the appraised DNFs were with correct CoD (Qaddumi et al., 2018). Moreover, the immediate CoD was accurate in only 5.9% of all DNFs, while the underlying CoD was accurate in 55.4% (Qaddumi et al., 2018). Another study in West Bank and Gaza Strip (GS) aimed at examining the accuracy of mortality statistics in Palestine, found that less than 50% of the underlying CoD was correct (Massad et al., 2019). A study aimed identifying the mortality trends of congenital anomalies among infants in GS from 2001-2010, found that high percent of personal and demographic data (76.8% of place of birth, 69.9% of death region, 19.1% of age group) were missing (Nagar, 2013). It seems that the Palestinian physicians who might be the golden standard reporting the CoD, aren't committed or not well-trained in correctly completing the sequence of CoD. In study conducted in West Bank to assess the physicians' knowledge and practice of completing the DNFs, found that the physicians' knowledge and practices were suboptimal and insufficient (Qaddumi et al., 2018). The design of the DNFs, the complicated cases, and the poor training were the main factors led to inaccurate CoD data (Qaddumi et al., 2018). The findings mentioned above highlight the significant challenges faced in accurately reporting infant mortality data in Palestine. The suboptimal quality of national mortality statistics, inaccurate reporting of CoD, and missing demographic data indicate a pressing need for a comprehensive assessment of the quality of infant death certificates in Palestine.

Given the importance of reliable mortality data for public health decision-making and policy development, it is crucial to ensure that the data collected is accurate, complete, and reliable. This study's main objective is to assess the quality of data in infant death certificates and explore the factors that influence the reporting practices of physicians in Palestine.

1.3 Rational and Justification

It seems that the Ministry of Health (MOH) review the infant DNFs in either a less systematic and regular way or the review is based more on a non-standardized tool. To the best knowledge of the researcher, this is the first study on assessing the completeness and accuracy of the infants' DNFs data among pediatric physicians in GS. Furthermore, the study will employ the mixed method approach to explore the knowledge, attitude, and the factors influencing the proper documentation practices of death certificates. Thus, it is crucial to understand the perspectives and experiences of physicians on what hamper them from correctly document and complete the DNFs. Such analysis could be the first step towards identifying the gaps and improving the quality of infant mortality statistics. The IMR can reflect the country health status, particularly in low middle income country such as Palestine which showed a fluctuating of the rates during the last decade. Complete and accurate infants' mortality data can be used in monitoring the infant health, estimate the burden of major diseases overtime and across different geographical areas, and evaluating the impact of health interventions. Accordingly, the study findings might be used by policymakers, healthcare planners, program managers, donors, and physicians for better planning, setting strategies according to on evidence-based recommendations, and allocating the resources based on the disease burden and top priorities.

1.4 Study objectives

1.4.1 General objective

The overall aim of this study was to investigate the documentation of practices of infants' (DNF) among pediatric physicians working in health facilities in order to improve the quality of infant mortality statistics in Gaza Strip.

1.4.2 Specific objectives

1. To determine the completeness of data within the infants' death notification forms during 2020.
2. To explore the accuracy of cause of deaths within the infants' death notification forms during 2020.
3. To investigate the knowledge, attitude and influencing factors of pediatricians towards completing the infants' death notification forms accurately.

4. To test the association between socio-demographic/work-related characteristics and the knowledge and attitude of pediatricians towards completing the infants' death notification forms.
5. To suggest evidence-based recommendations that might enable decision-makers and healthcare managers to plan and set strategies aiming at improving the documentation practices of infant mortality statistics.

1.5 Context of the study

In order to understand the health care system, the researcher provided some background information presenting in the next paragraphs.

1.5.1 Demographic context

From Ras Al-Nakoura to Rafah, Palestine spans a distance of 27,000 square kilometers (Annex 1). The Palestinian territories include the West Bank (5,655 sq. km), the GS (365 sq. km), and East Jerusalem. Egypt, the Mediterranean Sea, and the territories occupied in 1948 lie to the east and north of GS, leaving only a thin sliver of land in between. As much as two-thirds of Gaza's population has been forced to flee their homes. The GS area consists of the North Gaza, Gaza, the middle zone, Khan Younis, and Rafah (Annex2).

According to the Palestinian Central Bureau of Statistics (PCBS), 42.6% of the GS population is under the age of 15, while 3.9% is 60 or older (PCBS, 2020).

The estimated population living in the occupied Palestinian territory in 2021 was 4.95 million, with 3.01 million in the West Bank and 2.3 million in the GS (PCBS, 2020). Approximately 67% of the total population of the GS consists of the over 1.4 million registered refugees. According to the United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA), more than half a million refugees are housed in eight camps in the GS, while a quarter of all refugees in the West Bank call one of the 19 camps in that area home (UNRWA, 2022). Nearly 40% of Palestinians are children, and only 5% are 65 and older, making the Palestinian population overwhelmingly youthful (PCBS, 2020). In 2021, the average life expectancy for Palestinians born in the occupied Palestinian territory was 74.2 years old, with a disparity between the GS (73.8 years) and the west bank (74.5 years) (PCBS, 2021).

1.5.2 Political and Economic Situation

Since aid flows are insufficient to stimulate growth, the economy in GS has been in rapid decline for a decade, creating a dire situation in which every other person there is poor and over 70% of the population, who are disproportionately young, are out of work (The World Bank, 2018). Eighty percent of the Palestinian population now depends on aid from abroad due to years of conflict and blockade, and the ongoing intra-Palestinian conflict makes the humanitarian and service delivery crisis even worse. There is now an average unemployment rate of over 50 percent, and the number of Palestine refugees dependent on UNRWA for food aid has risen from less than 80,000 in 2000 to nearly one million today (UNRWA, 2022).

1.5.3 Health context

A country's health regulators can use health indicators as a reliable guide when deciding how best to protect its citizens from the epidemics and chronic diseases from which so many are afflicted. Vaccinations, public health promotion, school health, pregnant services, family planning, and care for noncommunicable diseases (NCDs) are all essential for different age groups (MoH, 2022). Moreover, in 2022 in the GS, thanks to improvements in health and a declining death rate, the average life expectancy of the population was 72.7 years, and 74.9 years for men and women respectively (MoH, 2022). According to the data published by MoH, the crude birth rate in the GS in 2021 is 3.39 per 1,000, which is a rise from the rate recorded in 2020 (2.84) (MoH, 2022). There were 1,412 deaths from infectious diseases in 2021, making up 20% of all deaths and increasing by 138% from the previous year. Of these, 94% were attributed to COVID-19, and the infectious disease death rate was 66 per 100,000 people. With a decrease from 8.7 per 1,000 live births in 2014 to 7.1 in 2021, the neonatal mortality rate has been steadily decreasing (MoH, 2022). In addition, the rate of postnatal mortality is 3.5%, down from 5.6% in 2014, for every 1,000 live births (MoH, 2022). The under-5 mortality rate was 12.2 per 1000 live births among Palestinians in the occupied Palestinian territory, which includes east Jerusalem, and the IMR was 10.5 (MoH, 2020).

1.5.3.1 Palestinian health care system

Under Israeli occupation of Palestinian land, which denies the rights of Palestinian citizens and violates all international treaties, conventions, and charters that guarantee the rights of all segments of the Palestinian people, the health care system in Palestine is complex and unique. The MoH faced a significant challenge as a result of the closures and separation that hindered access to health care services and disrupted the cohesion of the Palestinian health care system across all Governorates (MoH, 2020).

The MoH, UNRWA, Non-Governmental Organizations (NGOs), and private for-profit providers are the four main healthcare providers. The Ministry of Health (MoH) is responsible for providing all levels of healthcare to the public, from primary care to tertiary care, and for purchasing any specialized medical care that cannot be found in the country. Only refugees are eligible for UNRWA's primary care services; those in more dire circumstances must pay for private secondary care. Some tertiary care is also provided by NGOs. All three tiers of medical attention are provided by the for-profit private sector, which operates a wide range of specialized hospitals and diagnostic facilities.

1.5.3.2 Health information system

A health information system (HIS) plays a crucial role in assuring the availability of accurate and timely health information for operational and strategic decision-making that saves lives and improves health. In spite of their significance for evidence-based decision-making, health information systems in many developing nations are inadequate, fragmented, and frequently limited to disease-specific programming areas. An integrated HIS will enable public health practitioners to examine the health system from a larger, more holistic perspective. In Palestine, the regular health information system (RHIS) does not keep data at the level of the individual patient, but rather aggregates them at the level of the facility (Mimi, 2015).

1.5.3.3 Birth registration

Birth registration is an important step towards protecting individual rights and providing access to justice and social services for every person. Data showed that the percentage of births under 5 years of age registered in Palestine reached 99.2% in the civil registry in 2019, where it was 98.9% in the West Bank and 99.5% in GS (PCBS, 2022).

Steps for births registration (The National Committee for Documentation of Births and Deaths Data, 2023 a)

- In the event of childbirth, the health facility shall record the pregnant mother's entry data using the facility's approved paper or electronic forms.
- The obstetrician's supervisor then prepares and approves the birth status form for a baby born alive. The Patients' Affairs Section then delivers a copy of the live birth form to the parents and maintains a copy in the case's medical record in the health facility.
- The birth information is entered and the birth notice is extracted from licensed petition clerks of the Ministry of the Interior or any other channel specified by the Ministry of the Interior, and a birth registration transaction is issued.
- The birth notice must be approved by the administration of the health facility where the birth occurred, and a copy of the notice must be maintained in the health facility's medical record.
- In the case of a non-governmental health facility, the notification is approved by the closest Ministry of Health primary care center dedicated to the approval of birth notices.
- The Ministry of Health shall electronically notify the Ministry of the Interior of the data of live births registered in the Ministry of Health prior to the official arrival of the request for registration of a newborn at the Ministry of the Interior's civil status service centers.
- The Civil Status Services Centre of the Ministry of the Interior receives the application for birth registration and completes the following steps:

1. The receptionist is responsible for auditing the birth registration transaction and reviewing and certifying the application information.
2. The transaction is finalized, and the birth certificate and identity supplements for the parents are printed.
3. The transaction provider is provided with the certificate and its attachments.

1.5.3.4 Death notification form in Palestine

The COD and demographic characteristics parts make up the national DNF, which was organized in accordance with international standards (US Department of Health and Human Services, & CDC, 2003). The COD section is divided into two sections: Part I for describing

the sequence of events directly resulting in death, with the actual COD appearing on the first line and the underlying COD appearing on the line with the least amount of use; and Part II for describing all additional significant illnesses, injuries, or conditions that contributed to death. Mother and Child Services

Steps of documenting deaths (The National Committee for Documentation of Births and Deaths Data, 2023 b)

- The hospital physician who examined the deceased must report the death according to the approved system. The medical department's nursing staff must then notify the hospital's Patient Affairs Department of the death in order to initiate formal procedures for documenting the deceased's information.
- The Patient Affairs Department initiates the administrative data recording process in accordance with the approved Death Notification Form held by the Patient Affairs Department of the hospital.
- If the death is not referred to the forensic medical department, the medical examiner must complete the registration of the medical data on the form of death notification and then sign and approve it.
- The Medical Director verifies and authorizes the Death Notification Form (consisting of three copies). The administration of the hospital then stamps the form. The hospital administration then receives two copies of the form for the deceased's families, keeps a copy in the deceased's medical file, and sends the third copy to the Ministry of Health's Central Archives.
- The Patient Affairs Department records the form's data and electronic archiving in the Ministry of Health's Central Computerized Mortality Program.
- In the case of non-governmental hospitals, the relatives of the deceased must sign and seal the Ministry of Health's Death Notification Forms at one of the centers dedicated to the adoption of these forms, depending on the deceased's place of residence.
- Until the deceased's parents have gone to the Ministry of the Interior to record and confirm the case, the Ministry of Health shall electronically transmit its registered death data to the Ministry of the Interior for action.
- The Department of Forensic Medicine shall take appropriate action regarding deaths referred to it, update and approve the data on the Death Notification Form, and then forward the form to the Hospital's Patient Affairs Department for entry and electronic

archiving of the death data in the Central Computerized Mortality Programme of the Ministry of Health.

- Relatives of the deceased visit the closest Civil Status Service Centre of the Ministry of the Interior.
- The Civil Status Service Centre of the Ministry of the Interior shall:. The receptionist of the Ministry of the Interior receives the transaction and verifies the data's authenticity.

1. The Department of Birth and Death of the Ministry of the Interior receives applications to audit the transaction and reconcile data in the information system.
2. Issue the death certificate, sign and seal it, and print identity supplements.
3. Sending death certificates and completed prosecutions to the center's reception department for distribution to the families of the deceased.
4. Save transactions and applications both electronically and on paper in the relevant department.

1.5.3.5 Electronic health record (EHR)

Electronic health record (EHR) or electronic medical record (EMR), which is a collection of patient and population health information stored and managed digitally (Velthuis et al., 2013). It refers to patient data such as national health register data, Lab reports, X-Ray reports, physician notes, case history, hospital staff directory, medications, and surgical instruments. It displays the data sources within a healthcare delivery system. It is believed, however, that the enterprise has reached a point where big data may play a significant role in place of traditional management information systems (Groves et al., 2016). As a result, healthcare hospitals rely on big data technology to collect all of this patient information and provide caregivers with a comprehensive view for matching health care, health management, and patient management.

1.5.3.6 Mothers' health

1.5.3.6.1 maternal mortality rate

The maternal mortality rate for 2021 increased to 60 per 100,000 live births due to the fact that COVID-19 is responsible for 68% of maternal deaths (MoH, 2021).

1.5.3.6.2 Total fertility rate

The total fertility rate per woman of reproductive age was 3.35 (15-49 years)

Reports on births indicate that the majority of births took place in hospitals in general, and MoH facilities in particular, where the percentage of women born in health institutions was 100 percent. Approximately 65.2% of all births occurred in hospitals affiliated with the MoH (MoH, 2021).

1.5.3.6.3 Rate of visits of pregnant women

In the GS, pregnant women visited maternity and child care clinics at a rate of 6.1 per pregnant woman (5 in the MoH and 6.6 in the UNRWA) (MoH, 2021).

1.5.3.6.4 Family planning programmes

These programs occupy a significant portion of the attention of health service providers and the MoH. 16 947 women utilized family planning hospitals in the GS (4630 MoH, 12,317 relief agencies). IUDs became the technique of choice for 37.9% of all family planning methods, while the lowest rate was 0.3% (MoH, 2021).

1.5.3.6.5 Anaemia

The MoH places a high priority on anemia among pregnant women and children due to its impact on the health of mothers and children. The prevalence rate of anemia among pregnant women visiting governmental health centers was 40.5%. In the GS, the frequency of anemia among children aged 12 to 13 months was 70.2%. The MoH and UNRWA offer pregnant women free iron and folic acid supplements, as well as iron and vitamin D supplements for children under the age of three (MoH, 2021).

1.5.3.7 Child health

In all clinics operated by the MoH and the International Relief Agency, treatment and preventative child health services are available. In addition to monitoring the child's development in primary care centers, the Ministry offers free treatment for children under the age of three and gives them with iron and vitamins A and D.

In the GS, the frequency of thyroid insufficiency was 0.26 cases per 1,000 neonates while the incidence of Phenylketonuria was 0.14 instances per 1,000 newborns (MoH, 2021).

1.5.3.7.1 Breastfeeding

The MoH focuses on this issue by educating mothers about the significance of breastfeeding through seminars, pamphlets, and booklets for pregnant and breastfeeding moms. 46% of infants under 6 months of age were breastfed, whereas 89% of newborns were breastfed at the time of hospital discharge (MoH, 2021).

1.5.3.7.2 Integrated and Expanded National Vaccination Programme

This program reflects the vaccination of newborns and children against infectious diseases and is one of the MoH greatest accomplishments in collaboration with numerous other health organizations, most notably UNRWA. The entire vaccination rate is 99.3%, and this program has been revised multiple times till the number of diseases targeted for vaccination reaches 12 (MoH, 2021).

1.5.4 Governmental health services

The Palestinian healthcare system is comprised of five major providers: MoH, the primary provider of health services, UNRWA, NGOs, military medical services, and the private sector. MoH operates 14 hospitals in West Bengal and 13 in Gaza, as well as 583 primary health care centers (PHCCs) in West Bank and 52 in Gaza (MoH, 2020). In addition, UNRWA operates 22 PHCCs in Gaza. The healthcare system has suffered greatly as a result of the siege. The restrictions, frequent military attacks by Israeli forces, and funding cuts, combined with the COVID-19 pandemic, have contributed to the deterioration of medical infrastructure and shortages of drugs, equipment, supplies, and personnel, putting additional strain on an already overburdened health system.

1.5.4.1 Al Shifa Medical Complex (SMC)

Al Shifa Medical Complex is the biggest hospital in GS. It is located in the west part of Gaza. Its foundation dates back to 1946. It consists of three hospitals surgery, Internal medicine and maternity. In addition, a variety of primary care physicians, as well as those working in emergency rooms and outpatient clinics, refer patients to the three hospitals that provide care to the public. Where transferred to internal departments or hospital outpatients review the complex. According to MOH annual report (2020) of SMC, the total numbers of beds are 869 and while total numbers of employees are about 1889 divided as follows: Physician 459(26%), administrators 310 (17.5 %), & support medical technicians 222 (12.6%). At

SMC, the surgical pediatric department offers surgical procedures for children. It provides superior surgical care for children from birth to 12 years of age. Surgery is done on children's polycarbonate, reproductive, digestive, and respiratory systems. Cosmetic procedures, especially those involving the reproductive system, should also be performed on children. The department performed numerous surgeries involving conversion for treatment abroad. In terms of both quantity and quality, the department's surgical procedures have consistently surpassed those of many competing hospitals (Yellow. Place, 2021). Adding to this pediatric service, SMC provides care for the neonates through its neonatal intensive care unit (ICU).

1.5.4.2 Nasser Medical Complex (NMC)

The foundation for this hospital was laid in 1958, and it first opened its doors to patients in 1960 while operating under Egyptian control in the GS. There were a total of 120 beds at the hospital, divided into the surgical, dermatological, laboratory, and operating departments. Starting in 1966, the hospital underwent a period of rapid growth, with many new departments opening and the exteriors of existing buildings being expanded. Since Israel's withdrawal from the GS in 1994, the hospital's bed capacity has increased from 120 to 240, the number of physicians on staff has increased to 73, the number of nurses has increased to 135 and the hospital's total staff has increased from 120 to 240. (317). Moreover, the hospital administration has set up a number of medical centers, outpatient clinics, and new buildings tasked with providing high-quality medical care to residents of the southern region and other parts of the GS.

The NMC annual report for 2020 states that the organization now consists of three hospitals (Nasser Hospital, Al Tahreer Hospital, and Al Yasin Hospital), has 347 beds, and employs around 991. This number is broken down as follows: 241 physicians (24.2%), 351 nurses (35.3%), and 401 administrators and support staff (40.9%). The pediatric surgical department and neonatal ICU at Nasser hospital treat young patients.

1.5.4.3 European Gaza Hospital (EGH)

After the first intifada ended in 1989, the European Union donated funds to build a hospital for the Palestinian people. This hospital was funded by the European Union and built by UNRWA during a time when no legitimate government could. Talks to transfer hospital ownership to the MoH have been ongoing since the Palestinian Authority's arrival in 1994 as the legitimate authority in the country. In October 1997, the hospital was officially

transferred to the MoH with the provision that the European Union would provide the remaining funding, and that an international team would be present to oversee the handover.

As of 2022, the new EGH extension building as a pandemic hospital field for COVID-19 consists of a new ICU, in addition to the existing 179 physicians (23.11%), 385 nurses (32.14%), 241 administrators (28.86%), and 126 support medical technicians (15.86%). (MoH, 2021). Children with complex medical needs are treated at EGH's pediatric department, pediatric surgical unit, and neonatal ICU.

1.5.4.4 Al-Aqsa Martyrs Hospital (AMH)

A general hospital that provides internal medicine, surgical, gynecological, obstetric and pediatric services and serves residents Central Governorate, the number of beds is 129 beds, 103 of which are designated for accommodation Staff 562 employees from all categories (MoH, 2021).

1.5.4.5 Al Rantisi Specialized Pediatric Hospital

For children in Gaza, none is more important than those cared for at Al Rantisi Specialized Pediatric Hospital, one of the most prominent government-run facilities of its kind in the territory. Tertiary care is the highest level of medical attention that can be provided. The hospital was completed in 2006 after being constructed on a plot of land measuring over 2500 square meters in 2003. (Interview with the Director of Patient Services at Rantisi Specialized Pediatric Hospital, August 2019).

Health care for children under the age of 12 has been provided at the hospital since that time, and in 2012, the hospital's oncology and hematology services were expanded to include adult patients following a transfer of those services from Al-Shifa Hospital. There are now 15 specialized departments at the hospital, one of which is radiology. There are about 287 people employed there, and there are 56 pediatric and 30 adult beds available (Head of Patient Services Department at Rantisi Specialized Pediatric hospital, August 2019, interview).

1.5.4.6 Al Nasser Hospital

The Al Nasser Hospital for Children is the first hospital for perdiatric in the GS. Tertiary care is the highest level of medical attention that can be provided. The hospital provides services to children younger than 12 years old. Children can receive treatment at the

hospital's emergency room or admissions desk. The hospital has 292 workers and 121 patient beds (Interview with the Head of Patient Services Department at Al Nasser Hospital in August 2022).

1.5.4.7 Dora Hospital

New to the GS is Al Dora Hospital, a specialized children's hospital. The hospital's over 1600 square meters in size, having been constructed in the year 2000. (Interview with the Director of Patient Services at Dora Regional Medical Center, August 2019) The hospital's emergency room, admissions office, and even some specialized clinics all cater to pediatric patients, in addition to the radiology department. There are 87 beds and 200 workers at this hospital (Interview with the Head of Patient Services Department at Al Dora Hospital in August 2022).

1.6 Operational Definition

Infants: Babies who are less than a year.

The Infant Mortality Rate: Is the number of deaths of infants under one year old per 1000 live births**.** This rate is often used as an indicator of the level of health in a country.

Death Notification Forms: It is a permanent record that provides legal evidence that the person has died and states the cause of death**.**

Pediatric Physicians: The specialty of medical science concerned with the physical, mental, and social health of children from birth to young adulthood.

Health Facilities: They are places that provide health care. They include hospitals, clinics, outpatient care centers, and specialized care centers.

Pediatric Board: Refers to the certifying board that governs the certification process for pediatricians in Palestine. To become a board-certified pediatrician, physicians must complete an accredited residency program in pediatrics and pass a rigorous examination administered by the Palestinian Board of Pediatrics

Doctorate: A doctorate is an academic degree that is awarded to physicians who have completed advanced studies and research in a specific field.

Resident: A resident doctor, also known as a resident physician, is a physician who has completed medical school and is in the process of obtaining further training in pediatrics.

Residents work under the supervision of attending physicians and are responsible for providing care to patients in the hospital or clinic setting. They typically work long hours and are often required to be on call overnight and on weekends.

Specialist: is a physician who has completed additional education and training beyond medical school and a general residency program in a particular area of medicine. Specialization allows physicians to develop advanced knowledge and skills in a specific field, which they can use to provide more specialized care to their patients.

Chapter Two

Conceptual framework and Literature Review

2.1 Introduction

This chapter is divided into two main parts. The first part is a theoretical framework which includes definitions of the main concepts in the study: infants' mortality and DNFs with a clarification of some sub-concepts. The second part discusses some previous studies that other researchers have conducted regarding infants' mortality, DNFs and physicians' responsibility and factors influencing proper documentation.

2.2 The Theoretical Framework

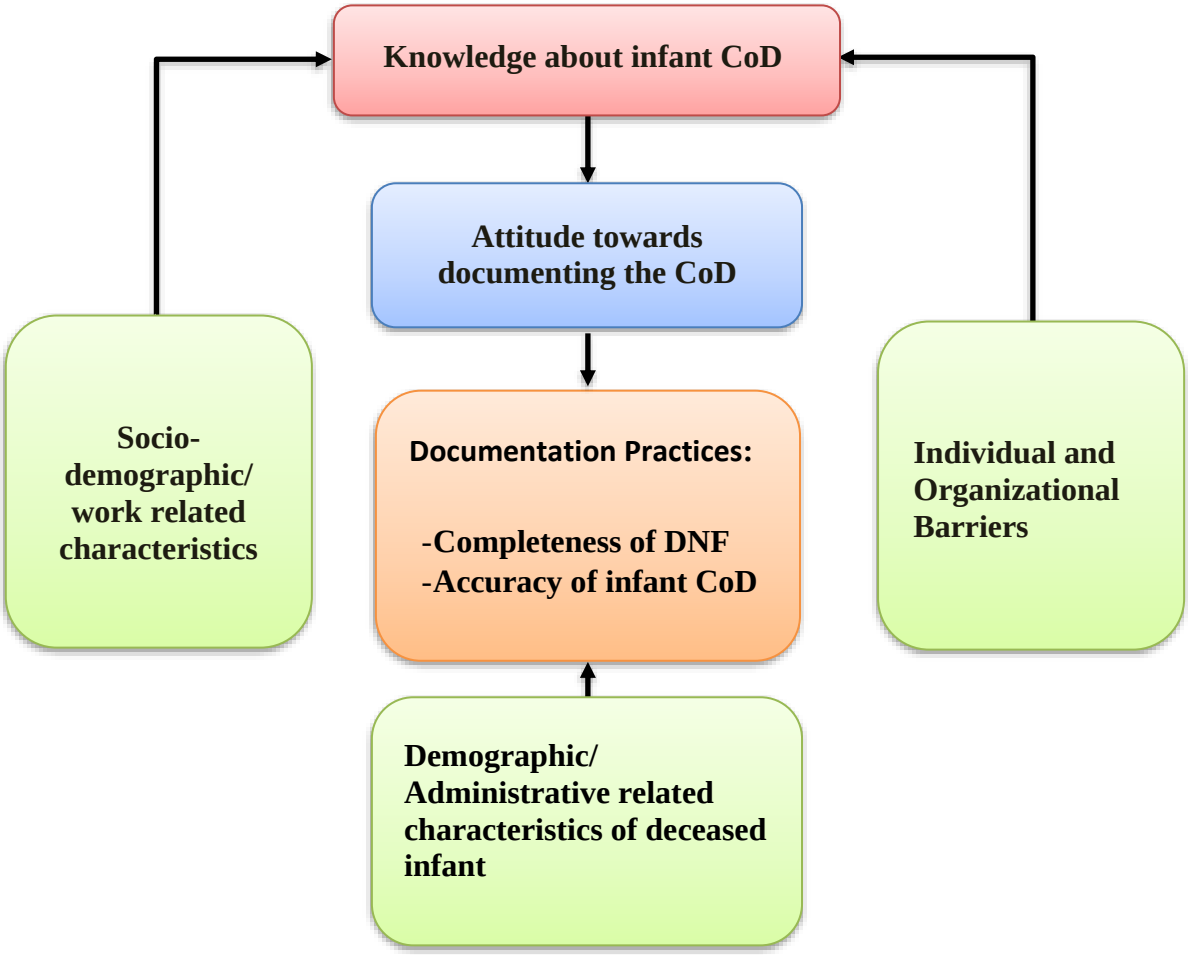

Figure 2.1: Conceptual framework (self -developed)

Knowledge, attitude, and practices (KAP) approach was used to investigate participants' perceptions of death certificate documentation practices and their own knowledge, beliefs, and actions in this area. One of the most popular models in the medical field is the KAP model. According to the KAP model, one's attitude and knowledge about a behavior are the two most important factors in determining whether or not that person engages in that behavior. Studies of knowledge, attitude, and behavior make the fundamental assumption of a direct correlation between the three variables (Warwick, 1983). On the other hand, there is some disagreement over whether or not there is a connection between knowledge, attitude, and behavior and in what direction that connection should be construed (Ajzen et al., 1982). Recent studies have shown that the nature of this connection is far more nuanced, suggesting that it may be mutual and ever-changing (Alexander & Dochy, 1995; Kim & Hunter, 1993). One way of looking at the relationship between knowledge and attitude is that one's attitude may shape one's behavior, and vice versa. Attitudes can also be correlated with actions, suggesting that one's actions can shape one's outlook (Fishbein, 1967), and this correlation has been shown to affect one's focus and concentration (Hoffman, 1986). In this way, one's outlook can affect the information they take in and the lessons they learn.

In addition, knowledge or attitude alone is not always a reliable predictor of behavior (Beavers et al., 1982). When all the evidence is considered, it's possible to draw the conclusion that knowledge, attitude, and behavior are all interconnected in complex and sometimes mutually reinforcing ways. Yet the study's author believes that if doctors had more information about how to properly report CoD, they would have a more positive outlook on the documentation procedures. It follows that in the absence of or in the face of relatively minor individual and institutional obstacles, a practice conducive to accurately filling out the DNFs would emerge.

At the center of the developed framework are the three dependent variables. Physicians' knowledge about the causes of pediatric deaths is affected by the independent variables such as sociodemographic and work-related characteristics, individual and organizational barriers, and demographic and administrative related characteristics of deceased infants.

Sociodemographic and work-related characteristics can include factors such as age, gender, years of experience, level of education, and type of healthcare facility. These factors may affect physicians' knowledge, attitude, and practices related to pediatric deaths.

Individual and organizational barriers refer to factors that may impede physicians' knowledge and practice of pediatric death documentation. These can include time constraints, lack of resources or training, and organizational culture.

The demographic and administrative related characteristics of deceased infants refer to factors such as CoD, age at death, and medical history. Physicians' knowledge and attitude may vary depending on the characteristics of the deceased infant.

Overall, this conceptual framework proposes that the sociodemographic and work-related characteristics, individual and organizational barriers, and demographic and administrative related characteristics of deceased infants all play a role in shaping physicians' knowledge, attitude, and practices related to pediatric death documentation.

2.3 Infant mortality

2.3.1 Global infant mortality

Infant mortality is defined as "the death of those under the age of one year by Roser et al. (2013). The IMR is the number of deaths in a population of humans under the age of one year (Treiber, 2017).

More than 5.0 million children under the age of five have died over the past two decades, with 2.4 million of those deaths occurring in infants. This tragic and widespread death toll, almost all of whose victims were children, serves as a sobering reminder of the urgent need to put an end to the preventable deaths of children and young people (Unicef, 2021).

As a whole, we have made great strides in lowering the global IMR. In 2017, an estimated 6.3 million children and adolescents passed away from largely avoidable causes. About 5.4 million of these deaths occurred in children younger than five years old, with 2.5 million occurring in the first month of life, 1.6 million between the ages of one and eleven months, and 1.3 million between the ages of one and four years (Unicef, 2018). Studies in 56 countries show that infant mortality, which accounts for 144 deaths per 1000 live births, is one of the world's public health concerns (Rutstein, 2000).

2.3.2 Infant mortality in Palestine

The IMR in Palestine rose to 9.6 per 1,000 births from the year 2020. Still, that's below what it was at this time a year ago. This is entirely attributable to the rise in awareness among pregnant women and the enhancement of health care services in Palestine. In addition,

perinatal conditions accounted for roughly half of all infant deaths, the most common of which were premature delivery and a low birth weight (MoH, 2021).

While at GS. The deaths of 603 infants under one year old were recorded in the year 2021. From 20.5 per 1,000 live births in 2006, the IMR in Gaza dropped to 17.1 in 2010 and will reach 10.6 in 2021 (MoH, 2022). The IMR for the West Bank was 8.8 per 1,000 live births, while it was 10.6 in Gaza (MoH, 2022).

2.4 Causes of Infant mortality

Various studies have been conducted around the world to identify factors influencing infant mortality. Several factors were reported to be reasons for infant mortality in different countries in the world. These factors include, not attending antenatal care follow-up (Dube et al., 2013; Leal et al., 2017), wealth index, birth interval (Khadka et al., 2015; Vijay & Patel, 2020), maternal age, maternal education (Santos et al., 2016; Kiross et al., 2019; Balaj et al., 2021), domestic violence (Varghese et al., 2013; Arun et al., 2017), and health-related behavior such as delaying seeking health care were among those (Koffi et al., 2017), living in rural areas with high poverty (Mohamoud et al., 2019), and having metabolic disorders (de Bitencourt et al., 2019).

In Palestine, the reported causes of infant mortality includes; congenital abnormalities 26.9%, respiratory system 22.1% premature childbirth and underweight 15.3%, cardiovascular diseases 10.3%, Sudden death and infectious diseases 8.7%, malnutrition 2.4%, Cerebral palsy 1.5%, Cancer and meningitis 0.9% for each % 9. Reasons related to childbirth 0.7%, Accidents and road accidents 0.4% for each (MoH, 2021).

2.5 Neonatal Mortality

The neonatal period—a newborn's first 28 days—is the most dangerous time of their life. With an average of 17 deaths per 1,000 live births worldwide in 2020, down 54% from 37 deaths per 1,000 in 1990, the first month of life is the deadliest for children around the world. In comparison, it was projected that in 2020, 11 babies out of every 1,000 would die between the ages of 1 and 12, while 9 babies out of every 1,000 would die between the ages of 1 and 5. One-third of all neonatal deaths occur within the first day after birth, and nearly three-quarters occur within the first week of life. In 2020, approximately 6,500 neonatal deaths occurred every day around the world (Unicef, 2022).

A number of previous studies have attempted to identify factors associated with neonatal admission (Gebremedhin et al., 2016; Demisse et al., 2017), and mortality (Thapa et al., 2013; Akinyemi et al., 2015; Sankar et al., 2016). Sepsis (Ersdal et al., 2012; Demisse et al., 2017; Seid et al., 2019) , respiratory distress syndrome (Andegiorgish et al., 2020; Alebel et al., 2020), preterm birth (Richter et al., 2019; da Fonseca et al., 2020), low birth weight (Haider et al., 2013; Seid et al., 2019), low apgar scores(a quantitative measure of neonatal vitality), at 1 and 5 min of birth (Cnattingius et al., 2020; Mu et al., 2021), low socioeconomic status (Tewabe et al., 2018; Lohela et al., 2019), cesarean section delivery (Bishop et al., 2019; Sobhy et al., 2019) and neonatal age on admission (Seid et al., 2019; Desalew et al., 2020).

Regarding the neonatal mortality rate in GS, it was 7,1 per 1000 births in the year 2021compared to 8.7 per 1000 births in the year 2014. While the post neonatal mortality rate was 3.5 per 1000 births in the year 2021 and compared to 5.6 per 1000 births during the year 2014 (MoH, 2021).

2.6 Prevention measures of infant deaths

2.6.1 Priority Strategies

The majority of infant mortality occurs in third world countries. Newborn survival and health can be improved and preventable stillbirths stopped with universal access to high-quality prenatal care, birth, postnatal care for mother and baby, and treatment for premature and sick infants. In effective midwife programs, Midwife-led Continuity of Care (MLCC) reduces the risk of premature birth by 24 percent. Throughout her pregnancy, labor, and postpartum, a single midwife or a small team of midwives provides primary care for the woman, with medical support available as needed (WHO, 2022).

Nearly 80% of births occur in health care facilities, which presents a fantastic opportunity to provide lifesaving care to newborns and identify and treat those who are at risk. Despite the fact that the first 24 hours after birth are the most crucial for detecting complications, few mothers and their newborns stay in the facility for the full duration. A disproportionate number of newborns die at home because of preventable factors such as improper care transitions after hospital discharge, lack of resources, and long wait times. These infants and their families receive the four recommended postnatal care contacts through doctor's offices and home visits (WHO, 2022).

2.6.2 Newborn care

All infants require thermal protection (such as encouraging skin-to-skin contact), hygienic umbilical cord and skin care, early and exclusive breastfeeding, assessment for serious health problems or need for additional care (such as in low-birth-weight, sick, or HIV-positive mothers), and preventative treatment (such as immunization against BCG and Hepatitis B, vitamin k, and ocular prophylaxis) (WHO, 2022).

A birth certificate should be obtained, the child should be vaccinated in accordance with national schedules, and emergency medical attention should be sought if necessary (danger signals include problems with feeding, decreased activity, difficulty breathing, fever, fits, or convulsions, or a general feeling of chilliness) (WHO, 2022).

2.6.3 Preterm and underweight newborns

In the event that a newborn with a low birth weight is observed at home, the family should be assisted in locating a hospital; increased care should be given to keeping the newborn warm, including skin-to-skin care, unless there are medically justifiable reasons for delayed contact with the mother; assistance with initiation of breastfeeding, including helping the mother express breast milk for feeding the baby from a cup or other means if necessary; extra hygiene, especially hand washing; and extra attention should be paid to the baby (WHO, 2022).

2.6.4 Sick newborns

Babies in serious risk should be identified and referred to the appropriate service for further diagnosis and care as soon as possible, whether in a medical setting or at home. A family who discovers their newborn child is ill at home should be helped in locating a suitable medical facility (WHO, 2022).

2.6.5 WHO response

WHO is collaborating with ministries of health and partners to do the following: 1) improve the quality of maternal and newborn care throughout pregnancy and the entire postnatal period, including strengthening midwifery; 2) expand quality services for small and sick newborns, including strengthening neonatal nursing; 3) strengthen midwifery; and 4) reduce inequity. Most newborn deaths occur within the first week of life (WHO, 2022).

2.7 Documentation practice among health professionals

Because it contains evidence and information specific to each patient, medical documentation is an essential part of patient care thanks to the work of medical reporters (Stewart et al., 2017). To authenticate medical practices with factual or substantial support by trained personnel, documentation is used. This involves recording what happened, when it happened, and how the authentication was accomplished (Kebede et al., 2017; Andualem et al., 2019). The process of documenting a patient's care plan, their requirements, the interventions to be carried out, and the evaluation of their outcomes is known as medical documentation. Documentation includes clinical observations, clinical evaluations, and expert opinion on patient care (Mamykina et al., 2012). Clinical subjective notes or personal reflections; Physicians, nurses, midwives, lab technicians, and other medical professionals; Acts (laws), Tests (medical procedures that involve testing a sample of blood, urine, or other substances from the human body), Checklists (those formats used to collect data in an orderly and systematic manner), Correspondence Books, Management Reports, and other Health Documents. High-quality medical documentation is required across the board, according to Akhu-Zaheya et al. (2018). Care providers can better coordinate their services and provide better care to their patients when they have access to a complete record of the patient's medical history (Khan et al., 2020). Keeping accurate and complete medical records is crucial to providing high-quality care (Bargaje, 2011). With this information at their fingertips, doctors and other medical staff can more easily monitor a patient's condition, conduct research, and make treatment decisions. It is widely accepted that doctors and other medical staff rely on patient records more than any other single tool. Medical staff should be required by hospital policy or ordinance to complete patient charts within their allotted shift (Singh & John, 2017).

Over the past decade, "medical records" has come to be commonly understood as "electronic health records" (EHRs). Even though the EHR are currently used to describe computer-based systems that perform a range of functions related to documenting and managing patient care, this won't always be the case. Clinical documentation now includes more than just doctors' notes. In the future, the EHR (as it is currently conceived) may be supplemented by or even superseded by other existing technologies such as registries, portals, connected home monitoring devices, and provider- and patient-controlled mobile devices (Kuhn et al., 2015).

2.8 Electronic medical records (EMRs) and certification

The development of electronic certification aims to accomplish several things: (1) make it easier for doctors to certify deaths by providing online explanations (descriptions of each part of the death certificate and illustrative examples of how to fill them); (2) reduce the number of mistakes made when filling out the death certificate, thereby increasing the accuracy of the data; (3) expedite the process of health surveillance and alert systems; and (4) increase data security and confidentiality. In addition, a training mode is available so that doctors can get some practice under their belts before having to produce an official electronic death certificate (Lefeuvre et al., 2014).

First, EMRs reduce medical errors through computerized prescription entry, predicting drug interactions and warning healthcare providers, assisting clinicians in reconciling patient medications, and most importantly, maintaining a detailed and legible medical record. Even though writing electronic clinical notes is more time-consuming, visits guided by an electronic medical record should be quicker and more efficient. EMRs enable doctors to see patients in a logical order while always having access to the most recent medical history. The process was complicated by the use of paper charts. Orders for medications, diagnostics, and other procedures can all be recorded in the electronic medical record (EMR), along with accompanying clinical notes. When compared to digital files, paper documents took up more room in filing cabinets. The system facilitates simple at-home access to medical records. The efficiency and quality of patient care in healthcare facilities is greatly enhanced by electronic medical record scheduling systems. Access to diagnostic tests and physician assessments is also provided promptly by the EMR system. The vast amounts of clinical data stored in EMRs are used in "big data" studies at universities. The EMR system is secure and user-friendly for both doctors and patients (Alpert, 2016).

Better quality mortality data, faster turnaround times for death certification, and the possibility of real-time mortality surveillance are all additional benefits of an electronic death registry system (Centers for Disease Control and Prevention, 2014).

The EMR, like any other innovative technology, is not without its potential drawbacks. Hackers can easily break into the system. Additionally, if there are computer system issues, the use of EMRs in a healthcare system can cause technical difficulties. As an added downside, the setup and upkeep of EMRs can be pricey. Training staff on how to use the EMR is a time-consuming process that necessitates adjustments to both the infrastructure

and the way things have always been done. It takes more time to create clinical notes in an EMR system than it would to write them by hand. It is also challenging to transfer information from one hospital using one EMR system to another hospital using a different EMR system due to the lack of interoperability between the various EMR systems. In the near future, interoperability between EMR systems is required by federal law in the United States. The EMR promotes the practice of re-posting previously written notes as new ones. Users of EMRs have voiced concerns about the software's complexity, frequency of crashes, the time and money required to train staff, the frequency with which passwords are forgotten, the number of available templates, and the lack of available narrative notes. In addition, EMRs in their current form are not useful for mental health professionals like psychiatrists and psychologists because they do not provide a comprehensive enough overview of the treatment process (Van Gool et al., 2014).

2.9 Importance of Death Registration

Death certificates, also abbreviated as DNFs, are used for death registration. Death certificates are an irrefutable proof of a person's passing. Inheritance and insurance claims, as well as the identification of heritable risk factors, can all be supported by this medical-legal document, making it essential both to the attending physician and the deceased's loved ones (Randall, 2014). DNF, as defined by Burger et al. (2007), is the primary source for mortality and disease statistics in South Africa, making it crucial for the development of public health programs and the allocation of public funds. The DNF must contain true and complete information. A death certificate is a government-issued document that declares the deceased person's CoD, place of death, and time of death. Registering a death is necessary for a number of reasons, including providing evidence in court, receiving pension or insurance payments, settling estates, getting married (if a widow or widower needs to prove that their previous partner has passed), arranging a funeral, helping government officials review the Certificate of Death (CoD) during investigations to determine if foul play occurred, and helping public health officials compile statistics. Because they are the only source of information about the causes of death and illnesses preceding death, mortality data from death certificates are critically important to public health policies.

2.10 Death Notification Form

DNF provide essential information regarding the prevalence of disease at the population level and its progression in the community. Mortality surveillance, which is done by analyzing these certificates, provides accurate data on morbidity and mortality, which is helpful in the development of public health interventions and in assessing the impact of those interventions (National Center for Health Statistics, 2003).

According to Hazard et al. (2017), the international death certificate has three parts: including conditions directly leading to death and antecedent causes including underlying CoD, other significant conditions and a column to record the suitable interval between onset and death.

2.10.1 Parts of Death /certification form

The primary terms used in death certification were defined by Brooks and Reed (2015) as follows: To begin, a physician, medical examiner, or coroner can issue a proclamation of death if they determine that a person is dead. Second, death time, or the estimated date and time of a person's actual death. CoD refers to the direct sequence of events that resulted in a person's passing. The fourth type of CoD is the most recent one, which occurred right before the time of death. On the death certificate, this is listed as the primary CoD. Fifth, the underlying CoD was an event that took place the farthest in the past from the time of death. On the death certificate, this is the final diagnosis. Sixth: CoD, also known as the "manner of death," which includes such categories as "suicide," "homicide," "accident," "natural," and "unknown." Seventh, a medical certifier of death is the person who attests to the facts of the decedent's death, such as the time of death, the reason for death, and the manner in which it occurred.

Because of incorrect CoD information on death certificates, health disparity tracking was flawed. One study of New York City death certificates found that the racial gap in premature heart disease between whites and blacks was underestimated because hospitals that incorrectly overreported premature heart disease served a disproportionately higher number of white patients than black patients (Johns et al., 2013). According to a study by Yin and colleagues estimated survival rates were inaccurate due to death certificates incorrectly classifying deaths from colon and rectal cancer. From 1993 to 1995, researchers compared cancer site data from the California Cancer Registry with CoD on death certificates and

found that 700 of 11,404 (6%) colon cancer deaths and 1958 of 5011 (39%) rectal cancer deaths were misclassified, with 1605 of 1958 (82%) misclassified as colon cancer. Correct reclassification of deaths resulted in a decline in the cause-specific survival rate for colon and rectal cancer (Yin et al., 2011).

Everyone involved in end-of-life care and death certification should be educated to ease the burden on the deceased's loved ones. Get through the paperwork quickly and ask questions that won't cause unnecessary distress to the grieving. Having respect for other religions and cultures is essential. Errors can be avoided in this field with the proper sensitivity training and familiarity with local and institutional procedures. There needs to be consistent revision of death policies (Aljerian, 2019). Department heads and managers should be aware of new technologies that streamline and speed up the death certification process in order to ease the burden on grieving families. Designated personnel should consult death reporting literature in order to make the most informed decisions. Managers and agency officials must conduct audits and keep tabs on deaths both in and out of hospitals around the world (Raadschelders et al., 2015; WHO, 2016). Therefore, there should be a system in place for filing complaints that is both fair and sympathetic. Risk is mitigated through meticulous record-keeping and a steadfast adherence to guidelines, even in extraordinary or difficult circumstances like wartime or pandemics (Aljerian & BaHammam, 2020). The vast majority of countries can use these methods in a variety of contexts (Al-Waheeb et al., 2015).

Two distinct halves make up the DNF in Palestine. (A) The decedent's demographic information, which includes their full name, date of birth, gender, residence, marital status, time and place of death, etc. Specifically, (B) the COD section, which has two subsections. If there was a series of unfortunate events that ultimately resulted in death, please detail them in Part 1 of the COD section. Both the proximate CoD (the last illness, injury, or complication that ultimately leads to death) and the underlying CoD are included here (the disease or injury that initiated the chain of morbid events that led directly and inevitably to death). In Part 2 of the CoD section, ancillary causes of death not included in Part 1 must be reported.

2.10.2 Types of errors in Death notification form

Errors in death notification are common and occur all over the world. These mistakes can range from inadequate notification to inaccurate information about the cause and manner of death, as well as the use of abbreviations (Qaddumi et al., 2018). Another study found that the percentage of complete and error-free DNFs was low (2.6%).

Rogena, et al. (2020) conducted a descriptive, cross-sectional study among youth and adults aged 15 and up with the intention of examining all available statements regarding immediate, underlying, and other CoDs. Incomplete information, such as the lack of information on the cause of blunt force trauma, was found to be the most common kind of error for the UCOD, as it accounted for the vast majority of injury-related deaths. The findings confirmed the importance of providing regular training for those who are responsible for filling out death certificates. CoD will become more accurate and comprehensive as a result, leading to more trustworthy statistics on mortality in Kenya.

Similar findings were found in a study by Burger et al. (2007) who set out to evaluate the fullness of information recorded on DNFs and the frequency of mistakes in the CoD sequence. The study opted for a descriptive strategy based on the whole population. Deaths occurring between June 1, 2003 and May 31, 2004 were included from two Cape Town neighborhoods. Researchers evaluated DNFs for completeness in terms of details about the deceased, looked for pre-specified major and minor errors, and used multivariate analysis to identify potential predictors of major errors. The study also discusses the factors that seemed to affect the frequency of major errors, including the number of lines of the CoD sequence that were completed, the age, gender, and area of residence of the deceased, and the type of facility where the DNF was completed.

Dunwoodie Stirton and Heslop (2018) conducted a cross-sectional study to present the results of a systematic review of research on the reliability of MCCD in determining the underlying causes of death in people with intellectual disability. This review compiles findings from studies that highlight the limitations of using MCCD to deduce the reasons for death in people with intellectual disability. Fifteen of the 25 articles included in the literature review raised questions about the reliability of MCCD in determining the cause(s) of death for people with intellectual disability, according to the study's findings. The most common problems involved incorrectly listing intellectual disability as an underlying CoD or underreporting intellectual disability on the MCCD.

In their study, they looked at data collected from the past at Blue Cross Hospital in Kathmandu. To determine the frequency with which errors in the CoD statement occurred and the nature of those errors, Maharjan et al. (2015) examined all death certificates and patient record files from December 2012 to December 2014. Due to the nature of statistical data, only the most egregious errors were considered, as any smaller discrepancies would have been less likely to mislead health policy planners and epidemiologists. Medical officers on duty promptly completed all death certificates after pronouncing a person dead. Death certificates for people over the age of 14 were prepared according to the national standard format provided by the Department of Health Services, Government of Nepal. During the two-year study period, 220 deaths occurred among 1055 admissions to the ICU at Blue Cross Hospital. Thirteen cases could not be included because their medical records were inaccessible, and three others were left out because they died shortly after being admitted to the ICU. This meant that 204 data files were used for analysis in the research.

Qaddumi et al. (2018) conducted a descriptive study using data abstraction sheets to analyze 2707 DNFs in the North West Bank/Palestine in 2012. Based on the data we collected, only 1% of the sampled DNFs had the CoD section filled out correctly. In 5.9% of all DNFs, the immediate CoD was correctly identified, and in 55.4% of all DNFs, the underlying CoD was correctly reported. The mortality and morbidity rates, public health research, and the process of providing evidence for health policy could all be impacted by this high error rate. Workshops on DNF completion training were recommended for new hires and residency program entrants. They also suggested reviewing national DNFs to streamline them and ensure they were in line with the most recent evidence-based guidelines and recommendations.

2.11 Knowledge and practice of physicians about death notifications form

According to the results of a study by Hazard et al (2017). Using a cross-sectional study design, they examined whether or not certifying doctors in Bangladesh follow international standards when filling out the MCCD or have evaluated the quality of clinical record keeping. There were 4914 death records used in the analysis. There was little variation in the percentage of medical records where the quality was too low to determine a CoD by age, hospital, or CoD. Medical professionals in Bangladeshi hospitals had problems accurately filling out the MCCD. The team concluded that the quality of medical records was low and that doctors frequently made mistakes when certifying deaths. As a result, there is an urgent

need in Bangladesh to enhance death certification procedures and the quality of hospital records.

A cross-sectional study was done at the Salmaniya Medical Complex in Bahrain to evaluate the doctors' competence in filling out death certificates. The study's authors concluded that doctors don't have the requisite background info to properly fill out death certificates. If these considerations were taken into account when revising the death certification process, and if physicians were given adequate training to complete death certificates, the accuracy of death certificates in the Salmaniya Medical Complex would improve. These findings suggest that Bahrain has always struggled with a high rate of deaths for which a CoD was not established. As a result, vital statistics suffer, and policymakers are led astray in their efforts to address health issues and control disease (Ali & Hamadeh, 2013).

Training and education on MCCD were provided by Hart, et al. (2020), who used a cross-sectional approach to report on the various country implementation strategies implemented under the D4H Initiative and evaluate their efficacy. They detailed three strategies implemented across the five countries studied (Myanmar, Papua New Guinea, the Philippines, Peru, and Sri Lanka). These methods included (1) TOT, (2) direct training, and (3) online and fundamental instruction. The data showed a contrast between certification quality before and after training; a before-and-after design was used rather than a random one due to its practicality. Based on the findings, it appears that there is room for improvement in the certification process as a whole.

The reporting of DNF certificates has improved following interventions in several studies that aimed to increase physicians' familiarity with and use of DNFs. In 2020, a seminar aimed at preventing mistakes on death certificates will be assessed. The rate of errors made by participants before the educational seminar was 72%; immediately after the training, it dropped to 34%; and two months later, it dropped to 24% (P 0.05) (Wood et al., 2020).

The credibility of medical CoD certifications is investigated across multiple centers using three different approaches to education in five different countries. The methods used included training of trainers, training of physicians, and basic and online training. This research demonstrates that a variety of training approaches can enhance the quality of certification (Hart et al., 2020).

Errors in the death certificate, such as listing a mechanism without a cause, competing causes, and improper sequencing, decreased after an educational intervention (P 0.001). (Azim et al., 2014).

A study conducted in New York City looked at the short-term and long-term results of a CoD educational program at 8 hospitals that overreported heart disease deaths using hospital-specific data on CoD reporting, conference calls with key hospital staff, and in-service training. Error rates on death certificates went from 68.8% before the intervention to 32.4% after it (P 0.001) (Madsen et al., 2012).

2.12 Summary of the previous studies

The accuracy and quality of medical records and death certificates have been a concern in various countries, including Bangladesh, Bahrain, Myanmar, Papua New Guinea, the Philippines, Peru, Sri Lanka, the United States, and Palestine. Several studies have shown that medical professionals face difficulties in accurately filling out death certificates, which can lead to inaccurate vital statistics and hinder policymakers' efforts to address health issues and control diseases. However, various interventions such as training of trainers, training of physicians, online and fundamental instruction, and educational programs have shown improvements in the quality of death certificates and medical records. These findings suggest that there is room for improvement in death certification procedures worldwide and highlight the importance of training and education for medical professionals in accurately certifying the CoD.

Chapter Three

Method and Materials

Introduction

The methods used to conduct the study are detailed in this section. The research design, population, sample, instruments, and methods are all introduced, along with a detailed explanation of how they were implemented. In addition, the study's findings are presented alongside their statistical analysis.

3.1 Study design

This research employed a mixed-method sequential explanatory design. Quantitative data was initially collected and analyzed. Interviews were conducted to collect the qualitative data needed to provide context for the quantitative findings. Mixed-methods research, which attempts to combine qualitative and quantitative approaches, has recently attracted the attention of those studying healthcare (Creswell & Clark, 2011).

3.2 Study Population and Setting

In the first phase, the study subjects consisted of all infant DNFs during the year 2020 at the MOH-Primary Healthcare Directorate (PHC) in GS/Palestine. The DNF is the formal form endorsed by the MOH for reporting the death information and causes. After filling the DNFs by the responsible physicians, they are sent back to the PHC for review and issue purposes. According to the MOH statistics, the total number of infant deaths' certificates was (574) in 2020.

In the second phase, the study population included all the pediatric physicians working in the governmental health facilities in GS. The total number of these physicians is 316 distributed in ten hospitals (Kamal Adwan, Al-Durrah, Al-Rantisy, Al-Nasr, Al-Shifaa, Al-Aqsa, Naser, European, Al-Najar, Al-Emarti).

3.3 Sample Size and Sampling Process

As the total number of infant deaths was 574 during 2020, the sample was a census and included all the infant DNFs. Not all qualifying DNFs were included in the study since the researcher was unable to locate them all; furthermore, some of the DNFs lacked all of the

essential information, including the hospital or physician's name. Further, certain DNFs were removed because they are considered as abortion and no DNF for abortion. Thus, the eligible infant DNF was 439 after excluding 135 DNFs from the total sample.

For selecting the pediatric physicians from governmental health facilities, a census sample was used even though the response rate was 208 physician. This type of sample was selected because the total number of pediatric physicians working infants is limited; as well the census sampling could give higher degree of accuracy.

The key informants for the in-depth interviews were purposefully selected after the assistance of the academic supervisor. The total number of interviewees was ten, including certifying pediatric doctors and senior pediatric doctors.

3.4 Study Period

The study was initiated immediately after receiving university approval and ethical approval from the Helsinki committee. The research was continued for a total of sixteen months, beginning in October 2021 and completed in January 2023.

3.5 Eligibility Criteria

3.5.1 Inclusion Criteria

For the DNFs, all forms of infants deceased in Gaza with age of equal or less than 12 months and issued by the MOH in 2020 were included. In addition, all pediatric physicians who have a registration and licensing certificate provide pediatric healthcare services, and work at the MOH health facilities at least for two months of the period of data collection were included as well.

3.5.2 Exclusion Criteria

During the time period of data collection, pediatricians who were not actively working in MoH health facilities for any reason (refusal, retirement, turnover, illness, travel abroad, etc.) were excluded. All volunteers, medical students, and female pediatricians who were on maternity leave at the time of data collection were also excluded, as were physicians who had been with the practice for fewer than two months.

3.6 Study Instruments

The researcher developed a data abstraction sheet based on the (WHO) guidelines for DNF data quality assessment (WHO, 1979) and the Centers for Disease Control and Prevention (National Center for Health Statistics, 2003) Annex 3. The completeness of DNFs focused on non-medical data such as the deceased's demographic characteristics (e.g. sex, hospital of death, date of birth and date of death), administrative details including date of admission, place and time of death, legible signature/name of certifying physician, and medical data indicating the immediate, underlying CoD, and comorbidities. The accuracy of medical data and CoD were examined by two well-trained and highly professionally pediatric physicians. In case of any discrepancies among the two pediatric physicians, a third expert was consulted to reach a consensus among all. Documenting multiple causes per line, approximate interval between onset and death, presence of blank lines within the sequence of events, abbreviations used in certifying the death, illegible handwriting, incorrect/clinically improbable sequence of events leading to death, and ill-defined conditions entered as underlying CoD were among the assessment criteria for determining the accuracy of the CoD (Rampatige et al., 2019).

The researcher created a questionnaire after conducting a thorough review of the relevant prior research (Burger et al., 2007; Qaddumi et al., 2017; Qaddumi et al., 2018; Washirasaksiri et al., 2018). (Annex 4). The focus of the questionnaire was on the physician's knowledge, attitudes, and impediments to death certificate documentation practices. It contained both positive and negative statements. In addition, it was translated into Arabic using simple language to ensure standardized questioning of participants and avoid translation variations that could undermine the credibility of responses. The questionnaire consisted of five sections: demographic/work-related information including gender, age, level of education, specialization, job position, work setting, monthly salary, and work experience, training and practice in completing death certificates; questions related to the level of knowledge towards death certificate completion, including 5 scenarios questions on the completion of DNF (physicians will be asked to complete the CoD section for five different infant deaths); questions related to attitude towards completing the DNFs; and questions related to the main factors the impede the compliance with completing the DNFs such as workload, lack of adequate data, demotivation, poor supervision, or inadequate training.

As a means of gathering qualitative data, in-depth interviews with key informants were conducted. Used a semi-structured, open-ended questionnaire (Annex 5). In-depth interviews were conducted to shed light on the reasoning behind the study's quantitative findings, inspire new ideas, and provide supporting evidence for the participants' perceptions.

3.7 Data collection

In the first phase, the researcher visited the Palestinian Health Information Center (PHIC) to get photocopies of all eligible DNFs. The researcher with the one well-trained pediatric physicians appraised the DNFs based on the aforementioned criteria. This phase was finished by five weeks as it was started on 5 July 2022 and finished by 15 August 2022.

In the second phase, the researcher collected data with the assistance of two qualified data collectors who were trained with an explanation of the study's purpose, objectives, questionnaire items, potential areas of misunderstanding, and how to distribute and collect confidential questionnaires. In order to reduce interviewer bias, data collectors were instructed on how to avoid interviewing errors and form a consistent impression of specific terminology. During the morning or evening work shifts, a questionnaire based on interviews was used to collect data. The average time required to complete the questionnaire is between 15 and 20 minutes. This phase of data collection began on 30 September 2022 and concluded on 15 November 2022.

After analyzing quantitative data, the researcher herself conducted key informant interviews in the final phase. Face-to-face interviews were conducted, and the average interview duration ranged from 30 to 40 minutes. All of the key informants were briefed on the study's purpose and primary characteristics. The interview guide was developed based on a review of the relevant literature and is used to ensure that information on the same general topics is collected from each participant, while allowing for a degree of flexibility and adaptability in the process (Kvale, 1998).

A semi-structured interview approach was chosen to provide more flexibility for both the participants and the researcher. The interview guide mainly focused on how the knowledge and attitude influenced the documentation practices within the DNFs, identification of the key barriers and their effects on the optimal documentation practices, explanation of the main quantitative findings, and determining the main suggested recommendations that might improve the quality of documentation practice among pediatric physicians. Each interview

was completed in one day based on the interviewees' availability, and the total number of interviews was completed in two weeks.

3.8 Scientific rigor

3.8.1 Face Validity

It is achieved by organizing the study instrument in special category for each domain with logical sequence.

3.8.2 Content validity

Two instruments were sent to a group of experts (annex 6) to evaluate the questionnaire's readability and applicability to the study's aims. All feedback was carefully considered, and as a result, some adjustments were made to the instruments. The questionnaire's data collection process also began with a pilot study.

3.8.3 Internal Consistency

The questionnaire's reliability is determined by calculating the Pearson's correlation coefficients between each paragraph in a field and the whole field in a survey sample of six questionnaires. The tables below display the p-value and correlation coefficient for each item in the respective fields. Tables 3.1 and 3.2 show that the p-values are less than 0.001, indicating that the field's correlation coefficients are statistically significant at either = 0.01 or = 0.05, respectively.

Table (3.1): Internal consistency of the physician attitudes questionnaire towards documentation practices

No.	Item	Pearson Correlation Coefficient	p-value
1.	It is my professional responsibility to complete the DNF and accurately write the COD	0.461	<0.001
2.	I believe that I am able to follow the recommended documentation practices of completing the DNF and	0.499	<0.001
3.	I believe that following the guideline of completing the DNFs will reduce rate of errors within the DNF	0.613	<0.001
4.	I believe that following the guideline of completing the DNFs will improve the quality of mortality statistics	0.55	<0.001
5.	I believe that following the guideline of completing the DNFs will help the decision makers to properly identify the leading causes of death	0.607	<0.001
6.	I believe that following the guideline of completing the DNF is time wasting	0.554	<0.001
7.	I believe that writing the CoD codes according to the ICD-10 is useless.	0.54	<0.001
8.	Anyone in the health team such as nurses or medical secretary can properly complete the DNF instead of enforcing the doctors to do that	0.436	<0.001
9.	I think the donors are the only one who can benefit from the information within the DNFs.	0.633	<0.001

Table (3.2): Internal consistency of the influencing factors questionnaire towards completing the infants' death notification forms accurately

No.	Item	Pearson Correlation Coefficient	p-value
1.	The policy/ guideline of completing the DNFs are inadequate.	0.244	<0.001
2.	Negative perception from doctors toward the importance of completing the DNF.	0.486	<0.001
3.	Most of the doctors had insufficient training on completing the DNFs and CoD accurately.	0.629	<0.001
4.	Doctors dislike the documentation practices.	0.569	<0.001
5.	Lack of motivation e.g letter of appreciation or hospital award for the most dedicated doctors who always complete the DNF accurately .	0.598	<0.001
6.	Inadequate patient medical data and patient history in the patient's medical record.	0.44	<0.001
7.	The design of the DNFs is not user-friendly.	0.136	0.049
8.	There is poor supervision and follow up from hospitals management on the compliance	0.609	<0.001
9.	The complexity of infant diseases make it is difficult to identify the right cause of death.	0.273	<0.001
10.	The lack of time hinders doctors from competing the DNFs accurately	0.529	<0.001

3.8.4 Reliability

Procedures were taken to ensure the accuracy of the instruments: In order to standardize and harmonize the data collection process, the interviewers who collected the information were given training on how to ask each question.

Data entry was done daily by the researcher so that she could check the accuracy of her records and re-enter any blanks if necessary.

At the end of the data entry process, we went back and reentered 5% of the data to double check data entry.

An instrument's reliability is defined by how well it consistently measures the target attribute. It is possible to measure the test's reliability by administering it twice to the same group of people and comparing the results. Coefficients of reliability above 0.7 are generally regarded as satisfactory, those between 0.5 and 0.7 5 as moderate, and those below 0.5 as

subpar (Koo & Li, 2016). It's recommended to wait two weeks to a month in between exams. It was unreasonable to expect contractors to respond to our questionnaire twice in such a short time frame given the current state of affairs. The statistician's explained that, overcoming the distribution of the questionnaire twice to measure the reliability can be achieved by using Cronbach's Alpha coefficient.

3.8.4.1 Cronbach's Alpha Coefficient

Using this method, we can determine how well each section of the questionnaire correlates with the overall mean. Cronbach's alpha typically takes the form of a numeric value between 0.0 and +1.0, with larger values indicating more internal consistency.

The results of the Cronbach's alpha calculation for each domain and the full questionnaire are displayed in Table 3.3. In this case, the outcomes varied between 0.580 and 0.716. This is an acceptable to good range, and it means the questionnaire is reliable.

Table (3.3): Cronbach's Alpha for Reliability

No.	Questionnaire domain	No. of items	Cronbach's alpha
1.	Attitudes towards documentation Practices	9	0.716
2.	Influencing factors towards completing the infants' death notification forms accurately	10	0.556
3.	Knowledge on right documentation Practices	18	0.580
Total		37	0.688

3.9 Pilot Sample

Prior to beginning data collection, a pilot study was conducted to test the validity and suitability of the questionnaire by pointing out weaknesses in wording, translation to Arabic, prediction of response rate, determination of the real time needed to fill the questionnaire, and identification of areas of vagueness. Twenty pediatricians from various departments across the MOH were chosen to pilot the survey. Some sections of the questionnaire were revised after pilot testing in order to clarify their purpose. However, the pilot questionnaire results were not included in the final analysis as major changes were done.

3.10 Ethical Considerations

Al-Quds University granted permission for the researcher to conduct the study (Annex 7). The Helsinki Committee granted the researcher ethical approval (Annex 8). The Director General of MOH and the Director of MOH hospitals in the GS also provided administrative approval (Annex 9).

Each questionnaire came with an extensive cover sheet that explained the study's title, goals, and confidentiality guarantees, as well as provided detailed instructions. Patients at MoH facilities were randomly selected for the study, and their consent was obtained by having them sign a consent form (Annex 10). To protect the client's safety, all of his data was kept strictly confidential and used only for this study. Patients were reassured that their information would remain anonymous and secure, and that it would be used only for scientific inquiry.

3.11 Data entry and analysis

After finishing up with data collection, the researcher analyzed the quantitative data using Statistical Package for Social Sciences (SPSS), version 25. Before starting to enter data, we had to first build the entry base and assign codes to the variables. At the time of data collection, we also entered the information. The analysis phase included tasks like data cleaning and data management for the relevant variables. Data description using measures of central tendency, such as age and years of experience, and measures of variability, such as standard deviation (SD) and variances. The percentage and frequency distributions of the categorized data were tabulated. The questionnaire's reliability was examined with Cronbach's alpha coefficients.

The mean and SD of each participant's knowledge score were reported. In addition, the participants' knowledge was divided into three groups: those who scored below 60% were labeled as having poor knowledge to reflect knowledge deficit, those who scored between 60% and 80% were considered to have acceptable knowledge, and those who scored 80% or higher had good knowledge. This method of classification has been utilized in the past in the academic literature (Alzahrani et al, 2022; Bloom, 1968).

Score of 5 The responses were recorded on a Likert scale to gauge the respondents' levels of agreement. According to the 0.79 interval, the participants' average attitudes could be broken down into the following five categories: For the purposes of this discussion, let's assume that a score of 1.00 indicates strong disagreement, a score of 1.80 indicates disagreement, a score

of 2.60 indicates fair agreement, a score of 3.40 indicates agreement, a score of 4.20 indicates strong agreement, and a score of 5.00 indicates strong agreement (Pimentel, 2010).

We'll give you 5 for that! The data on the barriers was gathered using a Likert scale. The average responses from our survey participants fell into three distinct categories: "weak," "moderate," and "strong," with scores between 1.00 and 2.59 being classified as weak barrier, 2.6 and 3.39 as a moderate barrier, and 3.4 and 5 as a strong barrier (Pimentel, 2010).

The cross-tabulation method of analyzing relationships between categorical variables was analyzed using the Chi-square test. Mean differences of dependent variables were analyzed using the Independent Student's t-Test and One-Way Analysis of Variance (ANOVA). A p-value 0.05 was considered to indicate statistical significance, and a 95% confidence interval was used.

Following the conclusion of the quantitative data analysis, the collected qualitative data was analyzed by means of coding and thematic analysis. To make data analysis easier, interviews were recorded and transcribed word-for-word. To get a feel for the data and review for emerging themes, each interview transcript was read multiple times. We made and checked a list of codes. Each code's data was looked at, and it was compared to the other codes' data. After separating responses into categories based on their themes, the researcher compared and resolved the results.

3.12 Limitations of the Study

The cross-sectional design of the study has limitations, such as its susceptibility to changes in context and its inability to provide answers about probable casualties. While the assessment criteria used in this study to evaluate the precision of CoD are reliable indicators of the accuracy of death certifications and mortality statistics as a whole, they are unable to detect the presence of misclassification in determining the true CoD. For instance, the program can't verify whether or not the date of death listed on the death certificate was the person's actual date of death. Since the survey's findings relied more on respondents' impressions than on an objective analysis, there are some questions that can only be answered with a personal opinion.

Another limitation was that not all eligible DNFs were included in the study because the researcher was unable to find them all; additionally, some of the DNFs did not include all of the required information, particularly the name of the hospital or the physician. Rather, some DNFs were excluded because they were based on abortion rather than death certificates.

Chapter Four

Results and Discussion

Introduction

In this final section, we summarize what we learned from the investigation. The results were arrived at by surveying 208 doctors with a self-administered questionnaire and observing and checking 439 DNFs using a data abstraction sheet. The first part of this chapter focuses on the demographics and background of the people who participated in the study. Then, using five hypothetical cases, we can see how physicians' perspectives, the factors that prevent them from correctly completing DNFs for infants, and their familiarity with correct documentation practices are distributed. Additionally, the current study assessed 439 DNFs. Whenever possible, statistical analysis was used to help the results make sense conceptually. Therefore, participants' preexisting characteristics were analyzed in relation to their knowledge, attitude, and barriers toward optimal practices. After the quantitative data analysis was completed, the next step was to analyze the qualitative data through coding and thematic analysis. As a result, the researcher was able to zero in on central themes, categorize responses by theme, and ultimately draw conclusions.

4.1 Descriptive statistics

4.1.1 Characteristics of the participants

Table (4.1): Physicians' Personal Characteristic (n=208)

Character	**Frequency**	**%**
Age (years)		
Younger than 30	39	18.7
30- 55	132	63.5
Older than 55	37	17.8
Gender		
Female	41	19.7
Male	167	80.3
Physician qualification		
Bachelor	63	30.3
Post-Graduate education	145	69.7

Table (4.1): Continued…

Specialty of post-graduation (n=145)		
High Diploma	3	2.1
Master's degree	91	62.7
Pediatric Board	30	20.7
Doctorate	21	14
Specialization		
Resident	111	53.4
Specialist	97	46.6
Specialty		
Neonatologist	164	78.8
Pediatrician (Pediatric Medicine)	26	12.5
Pediatric Surgeon	18	8.7
Position		
Senior	102	49.04
Consultant	4	1.92
Head of the department	27	12.98
Practitioner	75	36.06
Working hours per day		
More than 8 hours/day	31	14.9
8 hours/day	177	85.1
Salary		
Less than 5000 NIS	18	8.6
5000- 7500 NIS	179	86.1
More than 7500 NIS	11	5.3

NIS: New Israeli Shekel

The main age group was from 30 to 55 years which form 65.3% (n= 132) of the participants and 80.3% (n=167) were males. Most of the participants were from Rantesi hospital (38.5%) as it is the only pediatric specialty hospital in Gaza. About one-third (30.3%) of physician had a bachelor degree, the majority (69.7%) had a high qualification degree. Most of physicians were Neonatologist (78%), and about half of them were specialist (46.6%), the results are presented in Table (4.1).

Table (4.2): Participants Work-related Characteristic (n=208)

Character	Frequency	%
Total Years of Work Experience		
less than 10	44	21.2
10- 15	101	48.5
More than 15	63	30.3
Total Years of Work with pediatrics		
less than 10	67	32.2
10- 15	88	42.3
More than 15	53	25.5
Have received training on completing the DNF and CoD		
No	114	54.8
Yes	94	45.2
If Yes, Adequacy of the training received		
Inadequate	37	39.3
Uncertain	43	45.7
Adequate	14	14.9
The hospital has a written policies/guideline on competing the DNF and CoD		
No	24	11.5
Uncertain	159	76.4
Yes	25	12.1
Have you ever completed the DNF		
No	4	1.9
Yes	204	98.1
Working Place		
Najar Hospital	4	6.7
El-Aqsa Hospital	23	11.1
El-Emaraty Hospital	8	3.8
European Gaza Hospital	24	11.5
Al-Dura Hospital	22	10.6
Al-Shifa Hospital	20	9.6
Bet-hanoun Hospital	17	8.2
Rantesy-El Nasser Hospital	80	38.5

Table (4.2) shows the work related characteristics variables. 78.8% of the participated physicians had more than ten years of general work experience. The majority of participants (67.8%) had worked in pediatrics for more than ten years. In addition, 54.8% (n=114) did not receive training on how to complete the DNF and CoD. Only 14.9% of the 45.2% of participants who received DNF training described the training as adequate. Furthermore, the majority of participants, 76.4% (n=159), were unsure whether the hospital has written policies/guidelines on competing the DNF and CoD.

The median age of the participants in a similar related study conducted by Qaddumi et al. (2018) in the West Bank of Palestine was 29 years, ranging from 25 to 65 years. The male gender predominated (79.3%), and the majority of participants (63.3%) worked as resident physicians in government hospitals (63.3%). Formal trainers on completing the DNF were reported by 54.8% of participants who reported receiving training, but only 14.5% rated it as adequate. Consistent findings were also reported in other countries such as Qatar, Bahrain, Nigeria, and Palestine, where the proportion of trained physicians was only 22.7%, 19%, and 29%, respectively (Al-Kubaisi et al., 2013; Ali & Hamadeh, 2013; Izegbu, 2006). Furthermore, many studies addressed the physicians' need for training in order to complete the DNF; 27.4% of physicians in Qatar reported a need for additional training, compared to 77.6% of physicians in Bahrain (Al-Kubaisi et al., 2013; Ali & Hamadeh, 2013).

4.1.2 Knowledge of physicians regarding right documentation practices

Table (4.3): Distribution of the participants knowledge towards documentation practices

Item	Poor	Accepted	Good	W. Mean % (SD)	R.	Class.
	N (%)	N (%)	N (%)			
Determining the direct cause of death	157 (75.48)	26 (12.5)	25 (12.02)	39 (0.34)	4	Poor
Determining the original disease underlying the cause of death	190 (91.35)	14 (6.73)	4 (1.92)	33.4 (0.05)	5	Poor
Properly mentioned the mechanism of death	129 (62.02)	72 (34.62)	7 (3.37)	28 (0.25)	6	Poor

Table (4.3): Continued…

Item	Poor	Accepted	Good	W. Mean % (SD)	R.	Class.
	N (%)	N (%)	N (%)			
Properly mentioned the correct sequence of death	198 (95.19)	10 (4.81)	0	26 (0.24)	7	Poor
Using abbreviations	155 (74.52)	0	53(25.48)	62 (0.43)	3	Accepted
Writing Inappropriate information	56 (26.92)	0	152 (73.1)	86 (0.44)	1	Good
Unreadable handwriting.	126 (60.58)	0	82 (39.42)	69.7 (0.48)	2	Accepted
Overall mean	**168.5 (81)**	**30.5 (14.7)**	**9 (4.3)**	**58.5 (28.5)**	**-**	**Poor**

W. mean = weighted mean

Five case scenarios with 20 questions were used to assess physicians' knowledge of proper documentation practices. The scenario questions were graded on a two-point Likert scale as true or false. Table (4.3) shows the knowledge scores about the documentation practices among the participants. The overall weighted mean of physicians' knowledge was 58.5% with a SD of 25.5, indicating that physicians have an overall knowledge deficit.

Through the key informant interviews, the interviewees complained about their limited knowledge and experience, which impacted their ability to write correctly and properly, as well as the sequence of the DNFs. They also cited a number of factors affecting their knowledge and experience, including the fact that some doctors' experience is still current and they lack scientific experience in chronic diseases, and that the main reason for this is a lack of knowledge about the sequence of the DNFs.

In addition, the interviewees indicated that the theme of knowledge and experience requires additional work to improve the quality of DNF. Due to the lack of scientific experience in chronic diseases and the inexperience of some doctors, the DNFs is not written properly and correctly.

One of the interviewees said:

> *"There is a lack of knowledge and understanding in the writing of event sequences."*

Another interviewee believes that the theme of knowledge and experience was expressed as follows:

> *"Pediatricians complete death notification forms with a degree of inaccuracy, and the primary cause is a lack of knowledge and skill in writing the order of events."*

Also, the lack of knowledge could be interpreted as lack of training in the completion of death certificates, as well as a lack of monitoring and supervision. Through the key informant interviews, on the open-ended question of how do you think that most physicians still need more training on how to complete the DNFs accurately? And how can such training be practically invested to ensure the competing of DNFs accurately, there was a general consensus about the limited implementation of staff training. In addition, the interviewees described the staff training theme as scarcity and need more promoting.

In otherwise, the interviewees answered, they complain from shortage training and it was very limited, this affected on writing correctly and properly and the sequence of DNF, and they stated many of factors affecting on staff training such as stress and overload of work on the physicians, nature of work, working in non-educational hospitals, medical staff DNF commitment, appropriate daily clinical supervision process in hospitals and direction, and DNF feedback in early morning meeting with consultants, feedback in medical ground round discussion with reviewing, training deficit about the national standards of form DNF documentation.

On other hand, the majority of participants was consistent with these findings and results in this theme there was a general consensus about the main cause of training shortage, they answered there was the absent of continuous evaluating, monitoring, disclosure event, follow up and learning system inside the hospitals. They concurred that staff training in hospitals was confined to a handful of training events distributed in certain locations.

According to one informant, the MoH does not use staff training to increase the quality of DNF recording skills;

> "I think some physicians write the notification death correctly

but not completely, like missing the correct ICD10 also write the consequence of events not correctly like the immediate cause of death and the pre-existing disease, and also do not write the duration of the disease correctly."

Another interviewee considered the perception of the staff to evaluate the staff training as he said;

"I think that physicians in general, and pediatricians in particular, need extensive and frequent training to be reminded of how to write death notices and how to use ICD10 to be accurate and reflect the truth in DNFs."

Although the majority of interviewees noted that the MoH has structurally established a central training program and clinical supervision at hospitals for all staff, all agreed that the roles and responsibilities of managers and supervisors are unclear regarding DNF documentation and that they require additional training courses on how to correctly write DNFs. They stated the following;

"Regarding training, any additional training for doctors will increase their experience and will strengthen and support the way they write the death notification form in a clear and detailed manner. I suggest training on writing a death form and making hypothetical scenarios for common illnesses and cases that are in the nursery. I also suggest the directing managers or the department head managers to supervise and review doctors' death forms".

Consistent with this finding, a study conducted in the kingdom of Bahrain revealed a lack of physicians' knowledge about the completion of death certificates, with 72% of respondents unaware of the guidelines for death certificate completion and 97.2% unaware of the coding system used to code the causes of death in Bahrain (Ali & Hamadeh, 2013). Another study conducted in Pakistan reported doctors lack knowledge on how to identify and select the immediate cause, underlying CoD (Maqsood et al., 2022).

The participants' knowledge about mentioning the sequence of death correctly was the lowest item score with a weighted mean of 26% ± SD=0.24, followed by mentioning the mechanism of death correctly with a weighted mean of 28% ± 0.25. Such result could be attributed to the view that physicians working in governmental hospitals have a knowledge deficit in pathophysiology science. The result is in a line with previous studies 46% of physicians were not aware about the mechanism of death (Maqsood et al., 2022). Also, in

another previous study showed 42% of the physicians did not the difference between the CoD and the mechanism of death (Pokale & Karmarkar, 2016).

Then for, determining the original disease underlying the CoD was 33.4 ± 0.05, and determining the direct CoD scored 39 ± 0.34. All these items were considered as poor in the categorization. Two items were categorized as accepted; using abbreviations, and unreadable handwriting as scored 62 ± 0.43 and 69.7 ±0.48 respectively. Finally, one item was categorized as good; writing inappropriate information as it scored 86 ±0.44.

4.1.3 Distribution of major errors of documentation practices

Table (4.4): Major error in physicians knowledge responses regarding documentation practices in five cases scenarios

Question	Completely Correct		At least one Major error		Completely Incorrect	
	N	%	N	%	N	%
1. Direct cause of death	25	12.02	130	62.5	53	25.48
2. Mechanism of death	7	3.37	132	63.46	69	33.17
3. The original disease underlying the cause of death	4	1.92	141	67.79	63	30.29
4. Sequence of death	0	0	140	67.31	68	32.69
Overall mean	**9**	**4.33**	**135.7**	**65.26**	**63.25**	**30.41**

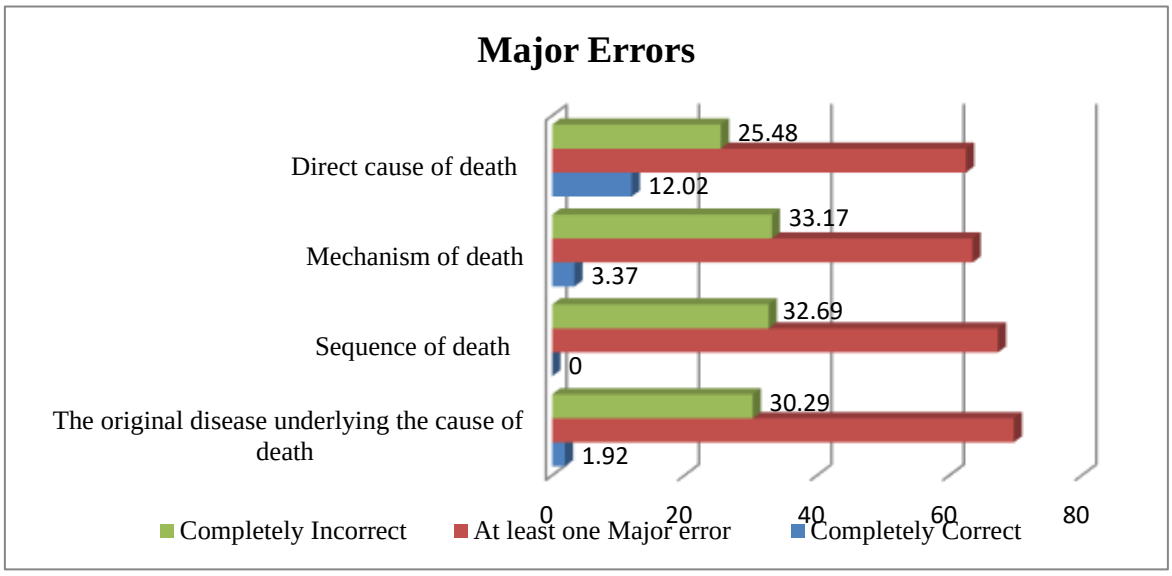

Figure (4.1): Distribution of Major Errors in the Case Scenario (n = 208)

The researcher classified the items of errors into major and minor errors as shown in Table (4.4) and Figure (4.1). Considering major errors as: failing to determine direct and original CoD, failing to determine the mechanism of death, and failing to determine the correct sequence of death; and minor errors as: using abbreviations, inappropriate information, unreadable handwriting (Park & Kim, 2022). The results reveal that 25.48% (n=53) of physicians failed completely to determine direct CoD in contrast of only 12.02% who determined it correct. In comparison with similar studies, Qaddumi et al. (2018) found that the immediate CoD was identified incorrectly by 51.3% of participants, which is higher than the figure reported in the current study. On the other hand, the study by Al-Kubaisi et al. (2013) showed a lower figure (21.5%). In addition, 77% doctors identified immediate CoD incorrectly, 83 % did not identify and interpret underlying CoD correctly among the physicians of Pakistan (Maqsood et al., 2022). Also, in Saudi Arabia, 75%of the death certificates provided no CoD (Aljerian & BaHammam, 2020). This variation in reported rates can be explained by the application of different criteria for assessing errors on death certificates in different studies, as there are no universally accepted criteria for assessing errors on death certificates.

Also, 30.29% (n=63) failed completely to determine the original disease underlying the CoD versus only 1.92% who determined it correctly. Moreover, none of them was able to completely follow the correct sequence of death and 32.69% (n=68) failed completely to follow the true sequence of death which consider a major error (Table 4.4).

The average number of people who made at least one significant mistake is 65.26 percent. Comparing our results to those of Qaddumi et al. (2018), we find that only 40.6% of participants filled out the CoD section correctly; this is a lower percentage than what they found. It was found that 64.26 percent of doctors did not make any mistakes during patient care, while 44.33 percent made at least one major mistake. According to Qaddumi's research, the two most common types of major errors are those involving a missing CoD after the CoD and those involving a wrong sequence. Results from this study are consistent with the idea that failing to correctly identify the underlying CoD is the most common major error. Contrary to our results, a similar study by Ossei et al. (2017) found that more than half of certificates were filled without errors, likely because the vast majority of its physicians are trained on death certification at the teaching hospital.

Lack of clear guidelines for doctors to follow when filling out death certificates, insufficient training for doctors, and a failure by health information management staff to keep track of

death certificate completion errors while coding may all contribute to the high error rate seen in the current study.

Additionally, almost one third of the case scenarios (33.17%) had the wrong mechanism of death filled in place of the "Immediate CoD," which was lower than the Qaddumi et al study in the West bank (49.3%). Comparatively, Qaddumi et al. (2018) found that 71.3% of West Bank physicians correctly identified underlying CoD, while Kubaisi et al. (2018) found that only 58% of Qatari physicians correctly identified underlying CoD (2013).

4.1.4 Distribution of minor errors

Table (4.5): Responses of the physicians' minor errors in all case scenarios

Question	Minor error		No minor error	
	N.	%	N.	%
1. Using abbreviations	155	74.52	53	25.48
2. Inappropriate information	56	26.92	152	73.08
3. Unreadable handwriting	126	60.58	82	39.42

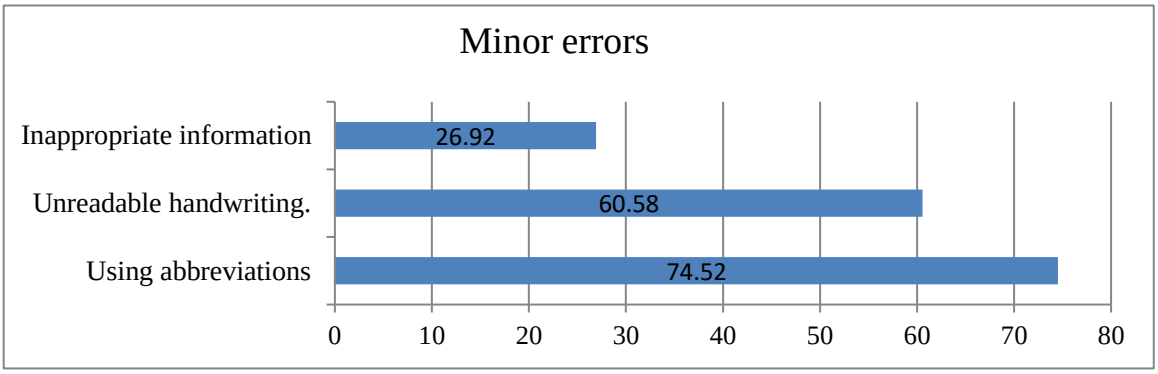

Figure (4.2): Minor Errors

Table (4.5) and Figure (4.2) shows that the most frequently occurring minor error by physicians; using abbreviations and symbols (74.52 %), followed by unreadable handwriting (60.58%). There was no DNF free of any minor error. Also, the most frequently occurring minor error by physicians was unreadable handwriting, followed by using abbreviations and symbols. In comparison, Qaddumi et al. (2018) showed 15 (10%) of DNFs were free of any minor error and the most frequently occurring minor error by physicians was using abbreviations and symbols, followed by irrelevant information.

However, the researcher observed that the errors reported in this study's case scenarios are significantly less frequent than those observed in actual DNFs. This may be explained by

the fact that physicians may view the scenarios as an examination and pay more attention to the answers than when completing a real DNF. In addition, self-administrative questions could have enabled physicians to review the topics in order to provide optimal responses or to seek assistance from expert physicians.

4.1.5 Attitudes of physicians towards documentation practices

Table (4.6): Distribution of the participants attitudes towards documentation practices

	SD	D	N	A	SA	Mean (SD)	R.M	R.	Class.
	n %	n %	n %	n %	n %				
Q1: It is my professional responsibility to complete the DNF and accurately write the COD	1 (0.5)	3 (1.4)	10 (4.8)	152 (73.1)	42 (20.2)	4.11 (0.53)	82.2	6	A
Q2: I believe that I am able to follow the recommended documentation practices of completing the DNF	0	1 (0.5)	6 (2.9)	143 (68.8)	58 (27.9)	4.24 (0.52)	84.8	2	SA
Q3: I believe that following the guideline of completing the DNFs will reduce rate of errors within the DNF	0	3 (1.4)	10 (4.8)	131 (63)	64 (30.8)	4.23 (0.60)	84.6	3	SA
Q4: I believe that following the guideline of completing the DNFs will improve the quality of mortality statistics	0	0	14 (6.7)	136 (65.4)	58 (0.53)	4.21 (0.55)	84.2	5	SA
Q5: I believe that following the guideline of completing the DNFs will help the decision makers to properly identify the leading causes of death	0	8 (3.8)	21 (10.1)	136 (65.4)	43 (20.7)	4.03 (0.68)	80.6	7	A
Q6: I believe that following the guideline of completing the DNF is time wasting	84 (40.4)	101 (48.6)	9 (4.3)	13(6. 3)	1 (0.5)	4.2 (0.83)	84.4	4	SD
Q7: I believe that writing the CoD codes according to the ICD-10 is useless.	111 (53.4)	1 (40.9)	4 (0.53)	85 (7)	3.4 (0.5)	4.43 (0.74)	88.6	1	SD
Q8: Anyone in the health team such as nurses or medical secretary can properly complete the DNF instead of enforcing the doctors to do that	40 (19.2)	132 (63.5)	24 (11.5)	12 (5.8)	0	3.96 (0.73)	79.2	8	D
Q9: I think the donors are the only one who can benefit from the information within the DNFs.	31 (14.9)	125 (60.1)	38 (18.3)	13 (6.3)	1 (0.5)	3.8 (0.77)	76.5	9	D
Overall mean	0	0	1 (0.48)	140 (67.3)	67 (32.7)	4.14 (0.26)	82.8 (4.59)	-	A

SA: strongly agree, A: Agree, N: neutral, D: disagree, SD: strongly disagree, R.M: relative mean, R.: rank, Class.: classification

Table 4.6 describes the domain of physicians' attitude towards documentation practices of DNFs which was determined by 9 questions. The overall mean of physicians' attitude was 4.14 ± SD of 0.26 (relative mean= 82.8%) which means that the physicians' attitude towards documentation practices is positive.

Moreover, the participants attitude toward each question was described in Table 6. For example, majority of the participants refused to consider the writing of the CoD codes according to the ICD-10 as useless and ranked as the first positive attitude (88.6%), followed the ability to follow the recommended documentation practices of completing the DNF (84.6%), and ranked in the third rank the agreeing that following the guideline of completing the DNFs will reduce rate of errors within the DNF (84.4%).

Although the total knowledge score was poor and considered deficit in our study, their attitude is positive. The result could be interpreted as follows: Their attitudes may be good since they believe in the importance of creating death certificates, medical documentation, and death statistics, but their knowledge is limited owing to a lack of education and ongoing training. This result is in a line with another similar study that showed 78% of the doctors agreed and have a positive attitude that the death certificate should be filled and completed correctly, however, filling out of the death certificate was inappropriate and incomplete as the CoD was not filled out in (97%) of the certificates (El-Nour et al., 2007). The variation between the results of knowledge, and attitude is present in different locations and topics (Çakmur et al., 2015; Narayana et al., 2017).

4.1.6 Barriers influencing completing the infants' death notification forms accurately

Table (4.7): Distribution of the barriers influencing completing the infants' death notification forms accurately (1 to 5 as 5 is the most important barrier)

	1	**2**	**3**	**4**	**5**	**Mean (SD)**	**RM**	**R**	**Class**
	n (%)	**n (%)**	**n (%)**	**N (%)**	**n (%)**				
Q1: Inadequate policy	13 (6.3)	57 (27.4)	66 (31.7)	54 (26)	18 (8.7)	3.03 (1.06)	60.6 (21.2)	6	MB
Q2: Negative perception toward the DNF.	34 (16.3)	88 (56)	42.3 (22)	26.9 (10.6)	8 (3.8)	2.43 (1.01)	48.6 (21.2)	10	MB
Q3: Insufficient training	10 (4.8)	72 (34.6)	71 (34.1)	35 (16.8)	20 (9.6)	3.6 (0.86)	72 (17.2)	3	SB

Table (4.7): Continued…

	1	2	3	4	5	Mean (SD)	RM	R	Class
	n (%)	n (%)	n (%)	N (%)	n (%)				
Q4: Dislike the documentation practices.	5 (2.4)	38 (18.3)	88 (42.3)	57 (27.4)	20 (9.6)	2.92 (1.04)	58.4 (20.8)	8	MB
Q5: Lack of motivation	4 (1.9)	46 (22.1)	115 (55.3)	29 (13.9)	14 (6.7)	3.24 (1.8)	64.8 (18)	5	MB
Q6: Inadequate patient medical data history	18 (8.7)	53 (25.5)	79 (38)	50 (24)	8 (3.8)	3.01 (0.84)	60.2 (17.2)	7	MB
Q7: Unfriendly design of the DNFs	6 (2.9)	23 (11.1)	49 (23.6)	79 (38)	50 (24)	2.89 (0.90)	57.8 (18)	9	MB
Q8: The high workload	2 (1)	30 (14.1)	90 43.3)	72 (34.6)	14 (6.7)	3.7 (0.8)	74 (16)	2	SB
Q9: Poor supervision and follow up	2 (1)	3 (1.4)	13 (6.3)	128 (61.5)	62 (29.3)	3.32 (0.80)	66.4 (16)	4	MB
Q10: Complexity of infant diseases	40 (19.2)	106 (51)	31 (14.9)	23 (11.1)	8 (3.8)	4.18 (0.7)	83.6 (14)	1	SB
Q11: Lack of time	2 (1)	19 (9.1)	68 (32.7)	91 (43.8)	28 (13.5)	2.29 (1.02)	45.8 (20.04)	11	MB
Overall mean	**1 (0.48)**	**12 (5.77)**	**142 (68.27**	**51 (24.52**	**2 (0.96**	**3.15 (0.40)**		-	

SB: strong barrier, MB: moderate barrier

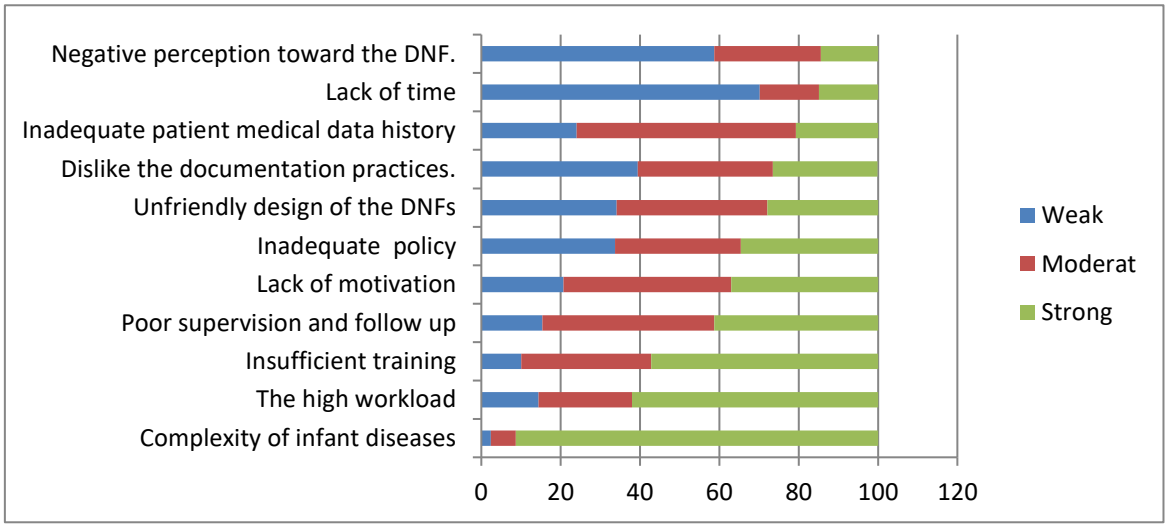

Figure (4.3): Classification of barriers influencing completing the infants' DNF accurately

Table (4.7) and Figure (4.3) show the distributions of barriers influencing completing the infants' DNFs accurately which was determined by 11 questions. The overall mean of

barriers was 3.15±0.4. It is clear from Table 4.5 that the complexity of infant diseases make it is difficult to identify the right CoD (Q10) was ranked as the first barrier influencing completing the infants' DNFs accurately (mean=4.18±0.7); followed by the high workload (Q8) (mean=3.7±0.8), insufficient training (Q3) (mean=3.6±0.86), and poor supervision (Q9) (mean=3.3±0.4) whereas, (Q11) (mean=2.29±1.02), the lack of time to compete the DNFs accurately was classified as the weakest barrier. These causes demonstrate the need for an updated training and refresher workshop in accordance with the protocols and guidelines. Also, the negative impact of physician overwork on documentation is evident and should be taken into account when distributing staff in departments, particularly where there are critical cases and the likelihood of death is high.

The interviewees complained about the limited staff time and workload, which negatively impact filling the DNFs completely and writing the sequence of DNF correctly. They also cited a number of factors affecting policies, procedures, protocols, and guidelines, such as a deficiency in writing the DNF documentation, a need for more time, heavy duties, a straight night shift, working more than 18 hours in a shift, and a lack of staff.

In addition, sometimes the doctors' heavy workload caused them to write the death forms quickly and complete so they could move on to other tasks. One of the interviewees said

> *"No time or opportunity to write a death notification form because we have to fill out other files, such as the death report, burial permits, and the note and discharge paper. These are the many papers that allow the doctors to quickly write the DNFs".*

The interviewees responded that there is a need for more time to write the death certificates that were distributed to all doctors, the primary barrier of completing the DNF correctly are overwork or overcrowding. One of the respondents said

> *"staff time and workload were constrained in DNFs activities, and that work pressure and a lack of time led some doctors to write incorrect DNF data or not complete DNFs at all in certain hospital areas".*

One key informant revealed that stress, work pressure, overload of work, and lack of time were the primary factors affecting the accuracy of DNF documentation. The informant stated,

"Some stress, work pressure, overload of work, and lack of time on the physicians and great workload of the doctors affected them and they wanted to write the death Forms quickly and finish it because they had other tasks to complete."

According to a second interviewee, the theme of evaluating the staff's perception of their time and workload was stated as follows:

" In most hospitals some doctors work night shifts or double shifts and therefore miss the morning meeting where the discussion of the majority of difficult and chronic cases occurs. Also, cases of morbidity and mortality are discussed during the morning meeting, and doctors lack experience because they no longer attend the morning meetings due to the 35-hour work week system."

Uncertainty in clinical medicine was found to contribute to GPs' difficulties in completing death certificates with certainty, and the family of the deceased was found to have some influence on how GPs completed death certificates, but the effects were not consistent between studies (McAllum et al., 2005). Death certificates in Thailand's provincial general hospitals were inaccurate because of a combination of factors, including inadequate training in medical schools and a lack of on-the-job assistance and mentoring for practitioners (Washirasaksiri et al., 2018).

4.2 Analytic Statistics

4.2.1 Mean difference of participants' knowledge toward DNFs

Table (4.8): Mean difference of participants' knowledge toward DNFs according to their characteristics

Categorical indept. vr.	N	R. mean (SD)	T	F	p-value	Post hoc
Age (years)						
Younger than 30[a]	39	56.14 (8.98)	-	3.12	0.046*	a *vs* b = 0.06
30- 55[b]	132	60.89 (11.42)				a *vs* c = 0.1
Older than 55[c]	37	61.59 (12.21)				b *vs* c = 0.98

Table (4.8): Continued…

Gender						
Male	167	51.23 (1.8)	0.483	-	0.63	-
Female	41	50.14 (1.8)				-
Physician qualification						
Bachelor[a]	63	57.89 (5.26)	-	6.88	0.0001*	b *vs* e = 0.001
High Diploma[b]	3	58.67 (10.4)				c *vs* e = 0.001
Master's degree[c]	91	59.51 (12.1)				
Pediatric Board[d]	30	56.84 (7.37)				d *vs* e = 0.001
Doctorate[e]	21	71.43 (9.5)				
Specialization						
Resident	111	48.79 (12.1)	2.7	-	0.007	-
Specialist	97	53.6 (13.3)				-
Specialty						
Neonatologist	26	59.11 (11.4)	-	0.81	0.448	-
Pediatrician (Pediatric Medicine)	164	60.59 (11.2)				
Pediatric Surgeon	18	57.31 (12)				
Position						
Senior[a]	83	57.64 (10.6)	-	6.4	0.0004*	a *vs* c = 0.001
Consultant[b]	4	68.42 (9.6)				c *vs* d = 0.005
Head of the department[c]	27	67.42 (10.9)				
Practitioner[d]	75	59.1 (11.3)				
Salary						
Less than 5000 NIS[a]	18	61.4 (11.1)	-	4.76	0.009*	b *vs* c = 0.001
5000- 7500 NIS[b]	179	59.4 (11)				
More than 7500 NIS[c]	11	69.9 (11.5)				
Working Place						
Najar Hospital[a]	4	72.6 (8.8)	-	5.6	0.0001*	a *vs* b =0.001
El-Aqsa Hospital[b]	23	56.1 (11.3)				a *vs* c =0.001
El-Emaraty Hospital[c]	8	53.3 (6.6)				a *vs* d =0.001
European Gaza Hospital EGH[d]	24	56.6 (12)				a *vs* f =0.002
Al-Dura Hospital[e]	22	65.8 (10.9)				a *vs* g =0.001
Al-Shifa Hospital[f]	20	57.6 (11.6)				
Bet-hanoun Hospital[g]	17	56.3 (9.1)				a *vs* h =0.04
Rantesy/El-Nasser Hospital[h]	80	60.7 (10.2)				

* Statistically significant

The mean difference between participants' knowledge of DNF and physicians' characteristics were investigated using t-test and one-way ANOVA. Table (4.8) reveals that physicians' level of knowledge about the documentation practices of DNFs is different within the groups of the qualifications, specialization, and salaries.

First: a statistically significant difference in the level of knowledge according to qualification was found, as the physician have a doctorates degree have a higher knowledge (relative mean = 71.43 ±9.5) than all others qualifications which reported means less than 60%. Second: a statistically significant difference in the relative mean of knowledge level was found between the specialist and the resident doctors (53.6% versus 48.79%); as well, a statistically significant difference in the mean of knowledge level was found among the head of the departments who were significantly higher than seniors and practitioners (relative mean = 67.42% ±10.9 versus 57.64±10.6, 59.1±10.9, respectively). Moreover, a statistically significant difference in the mean knowledge level was found among those who got salaries of more than 7500 NIS 69.9±11.5 and those who got wages ranging from 5000 to 7500 NIS.

In addition to the different salaries, the absence of incentives and rewards for doctors who write professional death certificates was also mentioned in the depth interviews. Someone stated,

> *"Unfortunately, even if someone did well, incentives and rewards are lacking."*

According to a second interviewee, the perception of the incentives support theme was expressed as follows:

> *"The lack of incentives for doctors who write the death certificate professionally and the absence of rewards for these doctors is another reason why doctors are not committed to writing DNFs professionally, and this is a very important point. If there are incentives or rewards for doctors who adhere to the death forms, we want all government and governmental departments within the MoH to care about this issue".*

These findings are in line with those of Hart et al. (2020), who reported there were not enough financial incentives for the participating hospitals and that a more culturally accepting environment was needed.

Competing priorities and the availability of suitable incentives may influence health workers' adoption of mobile birth and death notification strategies. In addition, the finding that enough incentives are available, offering financial incentives based on performance, is consistent with the study conducted by (Lin et al., 2022).

In comparison with previous research, these demographic factors and other were previously mentioned in the literature. For example, physicians' knowledge was affected by their experience (Maqsood et al., 2022), and specialty (Ossei et al., 2017).

Najar hospital was the highest work of place reported a good level of knowledge at 72.6% ±8.8 with a statistically significant difference in the mean of knowledge compared to other hospitals such as El-Aqsa Hospital, El-Emaraty Hospital, EGH, Al-Shifa Hospital, Bet-Hanoun Hospital, and Rantesy Hospital which all reported means of knowledge around or less than 60%. This finding could be interpreted by the different monitoring and supervisor in the different health facilities.

Through key informant interviews, the opinions regarding the role of hospital management, supervisors, and department heads in ensuring a complete and accurate DNFs were gathered. And to what extent are they supportive? The majority of participants cited their limited monitoring and supervision responsibilities when asked what they could do better. In addition, the interviewees stated that the theme of monitoring and supervision requires additional promotion and enhancement.

On the other hand, the majority of participants agreed with these findings and results in this theme, where there was a general consensus regarding the primary cause of poor monitoring and supervision; they cited a number of factors affecting monitoring and supervision, such as the lack of continuous tracking of DNFs, inadequate continuous reviewing, the need for more managerial follow-up for incomplete and data-deficient DNFs, the lack of interest from top-level management, and so on.

A key informant's opinion that the MoH does not use monitoring and supervision to improve the quality of DNF documentation skills was as follows:

> *"When we were incorrectly writing certain ICD10 codes or anything related, the department head wrote the death certificate herself and educated us on the correct writing."*

Some said:

> *"There is no one who honestly reviews DNFs. I believe the administration is uninterested in this matter, so auditing the documentation within the death notification form will result in a significant improvement."*

Another interviewee evaluated the staff's perspective on the theme of monitoring and supervision as follows:

> *"We're supposed to be auditing continuously in every hospital department, but we've only been doing it in the pediatric departments. However, your question prompted me to commission Board-eligible doctors to investigate. You motivated me to assign some doctors to periodically and continuously monitor the DNFs"*

This result is consistent with a recent study by Hazard et al. (2017) in which auditing tools were used to review death certificates for data inaccuracies. The study included 4,914 death certificates from hospitals in the Bangladeshi districts of Chandpur and Comilla; they discovered unsatisfactory outcomes after bringing the international form of the death certificate into Bangladesh; plausible causes include insufficient and absent physician supervision.

Makinde et al. (2020) reviewed the death registration completeness in Nigerian general hospitals and found that the DNF requires multisectoral implementation approaches, it potentially poses challenges to performance measurement as multiple stakeholders – with different and potentially conflicting measurement systems – are required to implement the DNFs.

Washirasaksiri et al. (2018) discovered in a retrospective study conducted at 14 provincial general hospitals in Thailand that interventions relevant to death certificate filling require additional monitoring. In addition, only 10.4% of respondents indicated that official personnel oversaw the COD coding of DNF.

Instead of certification by a single doctor, the certificate should be verified by a team of doctors. During normal business hours, a senior faculty member responsible for the dead patient's care should double-check all certifications. All death certificates must be subject to review, if necessary. All parties involved in the health care delivery system must work diligently together to address this issue. If this is not achieved, medical certification will no longer be the most significant tool for getting scientific and trustworthy data on death statistics.

The study also revealed that there are various factors affecting monitoring and supervision of DNFs, such as the lack of continuous tracking, inadequate reviewing, and the lack of interest from top-level management. The opinions of key informants suggest that there is a need for additional promotion and enhancement of monitoring and supervision, and that multisectoral approaches are required to implement the DNF effectively.

The study's results are consistent with previous research conducted in other countries that have identified similar challenges in the accurate completion of DNFs. The study recommends that instead of certification by a single doctor, the certificate should be verified by a team of doctors, and all death certificates must be subject to review if necessary. The study emphasizes the importance of collaboration among all parties involved in the healthcare delivery system to address this issue and ensure that medical certification remains a trustworthy tool for obtaining accurate death statistics.

Consistent with the findings of the present study, Rogena et al. (2020).'s research found that the DNF must regularly review and harmonize DNFs and tools to ensure the accuracy of data in the nation's death registries.

Also, Ali & Hamadeh. (2013), discovered that the formal supervision desired of DNF was not found, and whether or not they had read the guidelines in the death certificate manual and the physician needs more direction and follow-up to evaluate their performance level in accordance with the new manual DNF guidelines.

Interestingly, Qaddumi et al. (2018) identified a lack of monitoring and supervision as the most prevalent factor contributing to death certificate inaccuracy in the West bank. In addition, they determined that the monitoring and supervision of DNFs should be reviewed for accuracy by the attending physician and health care administrators before being submitted to higher authorities.

Consideration of submitting DNFs electronically will be beneficial, particularly for eradicating legibility and abbreviation issues and for completing any missing information once it becomes available. Thus, properly completing DNFs will improve the accuracy of the national mortality report and, consequently, decision making based on evidence.

Inconsistent with the finding of the current study that the gender does not affect the knowledge, female doctors significantly performed better than males in previous research (Ali & Hamadeh, 2013).

Table (4.9): Mean difference of participants' knowledge toward DNFs according to their work related factors

Categorical independent variable	N	mean (SD)	T	F	p-value	Post hoc
Total Years of Work Experience						
less than 10	44	56.8 (8.9)	-	7.25	0.0009*	a *vs* c =0.002
10- 15	101	58.9 (10.9)				c *vs* d =0.007
More than 15	63	64.3 (12)				
Total Years of Work with pediatrics						
less than 10	67	57.3 (8.8)	-	7.66	0.0006*	a *vs* c =0.001
10- 15	88	59.3 (11.5)				c *vs* d =0.011
More than 15	53	64.9 (12.2)				
Have received training on completing the DNF and CoD						
No	114	50 (12.4)		-	0.2264	-
Yes	94	52.2 (13.4)				-
If Yes, Adequacy of the training received						
Inadequate	37	58.6 (10.1)	-	3.45	0.03*	c *vs* a =0.014
Uncertain	43	60.7 (12)				c *vs* b =0.031
Adequate	14	69.2 (13.1)				
The hospital has a written policies/guideline on competing the DNF and CoD						
No	24	62.9 (10.8)	-	16.1	0.0001*	c *vs* a =0.037
Yes	159	58.1 (10.7)				c *vs* b =0.001
Uncertain	25	70.5 (8.9)				
Working hours per day						
8 hours	31	57.6 (13.6)		3.18	0.002*	-
More than 8 hours	177	49.85 (12.4)				

* Statistically significant

Furthermore, Table 4.9 shows a statistically significant difference in the mean of knowledge among those with more than 15 years of work experience who reported a better level of knowledge 64.3% ±12 compared to those with fewer years of experience who reported means of knowledge less than 60%. Regarding training programs, a higher level of knowledge was noted among those who receive training program and say that it was adequate (relative mean=69.2% ±13.1), and a statistically significant difference in the means

of knowledge were found compared to those who saw that the training programs were inadequate or were uncertain about the adequacy of training. Also, the physicians who were working only 8 hours per day were more knowledgeable than those who work more than 8 hours (57.6% versus 49.85%). This finding supports the previous finding of work overload.

In addition, the total years of experience, adequacy of the DNF and CoD received training, availability of written policies on competing the DNF and CoD in the hospital, the managerial position of the physicians, working hours per day, and the name of the working hospital were statistically significant factors with the level of knowledge.

Similarly. Work related factors affect the physicians' knowledge about completing DNFs in many studies such as years of experience at work (Pokale & Karmarkar, 2016). Formal training (Ali & Hamadeh, 2013).

4.2.2 Relationship between major errors and physicians' characteristics and work-related factors

Table (4.10): Relationship between major errors in documentation practices and personal characteristic of participants (n=208)

Categorical independent variable	Cause of death % Mean (SD)	p-value	Mechanism of death % Mean (SD)	p-value	Sequence of death % Mean (SD)	p-value
Age (years)						
less than 30 (n=39)	30 (0.27)	0.168	98 (18.4)	0.213	19 (0.20)	0.115
30- 55 (n=132)	42 (0.36)		99 (64.7)		27 (0.25)	
Older than 55 (n=37)	43 (0.35)		100 (16.9)		30 (0.23)	
Gender						
Female (n=41)	39 (0.34)	0.983	98 (0.05)	0.484	23 (0.28)	0.345
Male (n=167)	40 (0.35)		99 (0.05)		27 (0.24)	
Physician qualification						
Bachelor[a] (n=63)	33 (0.12)	<0.001**	100 (0)	0.120	26 (0.11)	0.001**
High Diploma[b] (n=3)	39 (0.33)		97 (0.09)		24 (0.23)	
Master's degree[c] (n=91)	36 (0.36)		100 (0.03)		24 (0.25)	
Pediatric Board[d] (n=30)	28 (0.23)		100 (0)		20 (0.18)	
Doctorate[e] (n=21)	76 (0.29)		99 (0.04)		50 (0.18)	
Post hoc test	e *vs* b, c, & d		-		e *vs* b, c, & d	
Specialization						
Resident (n=111)	34 (0.33)	0.009*	98 (0.06)	0.367	22 (0.23)	0.002*
Specialist (n=97)	46 (0.34)		99 (0.03)		32 (0.24)	

Table (4.10): Continued…

Specialty						
Neonatologist[a] (n=164)	46 (0.37)	0.584	94 (0.12)	0.001*	27 (0.22)	0.923
Pediatrician[b] (n=26) (Pediatric Medicine)	39 (0.34)		100 (0.02)		27 (0.25)	
Pediatric Surgeon[c] (n=18)	38 (0.32)		100 (0)		24(0.24)	
Post hoc test	-		a *vs* b & c		-	
Salary						
Less than 5000 NIS[a] (n=18)	35 (0.30)	<0.001**	93 (0.14)	0.001**	32 (0.21)	0.003**
5000- 7500 NIS[b] (n=179)	65 (0.27)		100 (0.03)		25 (0.24)	
More than 7500 NIS[c] (n=11)	66 (0.28)		98 (0.06)		49 (0.21)	
Post hoc test	a *vs*, b & c		a *vs* b & c		b vs c	

*t-test, ** F-test: significant level less than 0.05

Participants' knowledge in terms of a) documenting an acceptable CoD, b) correct mechanism of death and c) correct sequence of death, which reflected major errors in writing DNFs, were investigated in relation to participants' personal characteristics using the one-way ANOVA.

Table 4.10 reveals that physicians' qualifications, specialization, and salaries were statistically significant variables with the level of knowledge about the documentation practices of DNFs. It is clear from the table that the percent mean of correct acceptable CoD amongst physicians with doctorate's degrees was higher than other qualification categories (76%). Similarly, writing a correct sequence of death was the highest among the doctorate's degree category (the mean of correct =50%). The results indicate that a higher education has a positive effect on the physician knowledge about the completion of death certificates. The result is in a line with a previous study that showed qualifications of the certifier of forms have a significant effect on the completion of the DNFs in the regression analysis model (p=0.022) (Mwenda & Thaimuta, 2020).

Also, those who had a salary less than 5000 NIS were the lowest mean score (the mean of correct =35%) who conducted acceptable causes of death. Also, the salary group (5000-7500 NIS) has a lower statistically significant difference than the salary group (more than 7500 NIS) who wrote the sequence of death correctly. Moreover, specialist physicians (the mean of correct =46%) succeeded to write a correct CoD and sequence of death more than residents (the mean of correct =34%). The result is expected in that the resident doctors are

still under training while providing the medical service to the patients. In a line with the results, major errors were less often made by specialists compared to resident physicians in a previous study (Qaddumi et al., 2018).

4.3 Quality of Death Notification Forms

4.3.1 Characteristics of the DNFs

Table (4.11) : Characteristics of the deceased infant within the DNFs (n=439)

Character	**N**	**%**
Age (days)		
1 to 6 days	144	32.8
7 to 28	78	17.77
29 to 1year	217	49.43
Range (1, 366)	**Mean= 80.67**	**SD= 101.8**
Gender		
Female	171	38.95
Male	268	61.05
Hospital name were death had occurred		
European Gaza Hospital	35	7.97
Najar Hospital	5	1.14
El-Emaraty Hospital	13	2.96
Nasser	71	16.17
El-Aqsa Hospital	19	4.32
Al-Shifa Hospital	175	39.87
El-Nasser	72	16.40
Rantesy/EL-Nasser Hospital	12	2.73
Al-Dura Hospital	14	3.19
Kamal Edwan	23	5.25
Legible signature/name of certifying physician		
Yes	435	99.1
No	4	0.9
ICD-10 for the underlying CoD		
Available	334	76.1
Unavailable	105	23.9
ICD-10 for the underlying CoD		
Right	202	46
Wrong	237	53.9

The mean of age of deceased infant per days was 80.71 day with SD of 101.8 ranged from one day to 365 days. The majority are males (61.05%), more than one third of the DNFs were from Al-Shifa hospital (39.87%, n=175). The name of certifying physicians was written in the majority of the DNFs (99.1%) and the cause of disease is available in 76.1%, and is determined correctly in 46% of the DNFs.

4.3.2 Major errors in DNFs

Table (4.12): Major error in DNFs (n=439)

Character	N	%
Cause of Death		
Available	436	99.3
Unavailable	3	0.7
Acceptable Cause of Death		
Acceptable	243	55.7
Unacceptable	193	44.3
Mechanism of death		
Available	390	88.8
Unavailable	49	11.1
Mechanism of death		
Proper	328	84.1
Improper	62	15.9
Correct sequence of events leading to death		
Yes	223	50.8
No	216	49.2
Multiple causes of death per line		
Yes	22	5
No	417	95

The DNFs were evaluated for filling errors. About half of DNFs (44.3%) had unacceptable CoD. The mechanism of death was reported in the majority (88.8%) of the DNFs. However, 15.9% were improper mechanisms of deaths (out of the available 390). Moreover, 49.2% of the DNFs had incorrect sequence of events leading to death and 5% had multiple causes of death per line. Mechanism of death was the commonest major error in the previous research, 28.5% in Alipour et al. (2022). Writing the death mechanism instead of the CoD is one of the most prevalent major errors, according to research conducted by Madadin et al. (2019) on death certificates filled out in the Middle East. Qaddumi et al. (2018) found that this was the most frequent kind of major error.

4.3.3 Minor errors in DNFs

Table (4.13): Minor errors in DNFs (n=439)

Character	N	%
Illegible handwriting		
Yes	152	34.6
No	287	65.4
Use of abbreviations		
Yes	150	34.1
No	289	65.8
Time interval between onset and death		
Yes	155	35.3
No	284	64.7

When DNFs were checked for minor errors, the DNFs were not error-free. In 64.7% of DNFs, doctors made the minor errors of not noting the time lapse between the onset of symptoms and the patient's death. Table 0.13 displays the data, showing that around 34.6% of forms had illegible handwriting and that approximately 34.1% of DNFs utilized abbreviations. Minor error rates ranged from 37% to 100% in other research (Qaddumi et al., 2018; Kubaisi et al., 2013). The dissimilarity in the criteria used to classify minor errors in the forementioned studies may account for the variations in the error rate.

4.3.4 Relationship between right documentation practices and characteristics of decades from CoD data

Table (4.14): The relationship between the characteristics of deceased infants and the major errors

Categorical independent Variable	Acceptable Cause of Death			Proper Mechanism of death			Correct sequence of events leading to death		
	Yes n %)	No n (%)	p-value	Yes n (%)	No n (%)	p-value	Yes n (%)	No n (%)	p-value
Age (days)									
1 to 6 days	84 (34.57)	60 (30.61)	0.073	114 (34.76)	30 (27.03)	0.132	74 (33.18)	70 (32.41)	0.060
7 to 28	50 (20.6)	28 (14.29)		61 (18.6)	17 (15.32)		49 (21.97)	29 (13.43)	
29 to one year	109 (44.86)	108 (55.10)		153 (46.65)	64 (57.66)		100 (44.43)	117 (54.17)	
Gender									
Female	97 (39.92)	74 (37.76)	0.644	126 (38.41)	45 (40.54)	0.691	91 (40.81)	80 (37.04)	0.418
Male	146 (60.08)	122 (62.24)		202 (61.59)	66 (59.46)		132 (59.19)	136 (40.81)	
Hospital name where death had been occurred									
European Gaza Hospital	19 (7.82)	16 (8.16)	0.001*	26 (7.93)	9 (8.11)	0.001*	16 (7.17)	19 (8.8)	0.001*
Najar Hospital	1 (0.41)	4 (1.04)		1 (0.30)	4 (3.6)		1 (0.45)	4 (1.85)	
El-Emaraty Hospital	2 (0.82)	11 (5.61)		7 (2.13)	6 (5.41)		2 (0.9)	11 (5.09)	
Nasser	39 (16.05)	32 (16.33)		47 (14.33)	24 (21.62)		31 (13.9)	40 (18.52)	
El-Aqsa Hospital	6 (2.47)	13 (6.63)		12 (3.66)	7 (6.31)		7 (3.14)	12 (5.56)	
Al-Shifa Hospital	83 (34.16)	91 (46.43)		134 (40.85)	40 (36.04)		82 (36.77)	92 (42.59)	
El-Nasser	62 (25.51)	9 (4.59)		61 (18.6)	10 (9.01)		56 (25.11)	15 (6.94)	
Rantesy/ EL-Nasser Hospital	12 (4.49)	0		12 (3.66)	0		12 (5.38)	0	
Al-Dura Hospital	9 (3.7)	5 (2.55)		13 (3.96)	1 (0.9)		9 (4.04)	5 (2.31)	
Kamal Edwan	10 (4.12)	15 (7.65)		15 (4.57)	10 (9.01)		7 (3.14)	18 (8.33)	

* Statistically significant

Table (4.15): The relationship between the characteristics of deceased infants and the minor errors

Categorical independent variable	Illegible handwriting			Use of abbreviations			Time interval between onset and death		
	Yes n (%)	No n (%)	p-value	Yes n (%)	No n (%)	p-value	Yes N (%)	No n (%)	p-value
Age (days)									
1 to 6 days	50 (32.89)	94 (32.75)	0.045*	67 (44.67)	77 (26.64)	0.001*	42 (27.1)	102 (35.92)	0.014*
7 to 28	18 (11.84)	60 (20.91)		25 (16.67)	53 (18.34)		38 (24.52)	40 (14.08)	
29 to one year	84 (55.26)	133 (46.34)		58 (38.67)	159 (55.02)		75 (48.39)	142 (50)	
Gender									
Female	63 (41.63)	108 (37.63)	0.435	62 (41.33)	109 (37.72)	0.461	113 (39.79)	58 (37.42)	0.627
Male	89 (58.55)	179 (62.37)		88 (58.67)	180 (62.28)		97 (62.58)	171 (60.21)	
Hospital name where death had occurred									
European Gaza Hospital	8 (5.26)	27 (9.41)	0.001*	7 (4.67)	28 (9.69)	0.001*	11 (7.1)	24 (8.45)	0.001*
Najar Hospital	4 (2.63)	1 (0.35)		0	5 (1.73)		0	5 (1.79)	
El-Emaraty Hospital	9 (5.92)	4 (1.39)		1 (0.67)	12 (4.15)		2 (1.76)	11 (3.87)	
Nasser	15 (9.87)	56 (19.51)		19 (12.67)	52 (17.99)		37 (23.87)	34 (11.79)	
El-Aqsa Hospital	8 (5.26)	11 (3.83)		10 (6.67)	9 (3.11)		8 (5.16)	11 (3.87)	
Al-Shifa Hospital	80 (52.63)	94 (32.75)		94 (62.67)	80 (27.68)		19 (12.26)	155 (54.58)	
El-Nasser	11 (7.24)	60 (20.91)		5 (3.33)	66 (22.84)		58 (37.42)	13 (4.85)	
Rantesy/ EL-Nasser Hospital	2 (1.32)	10 (3.48)		3 (2)	9 (3.11)		12 (7.74)	0	
Al-Dura Hospital	1 (0.66)	13 (4.53)		2 (1.33)	12 (4.15)		3 (1.94)	11 (3.87)	
Kamal Edwan	14 (9.21)	11 (3.83)		9 (6)	16 (5.54)		5 (3.23)	20 (7.04)	

*statistically significant

The relationship between DNFs' major and minor errors was investigated and presented in Tables (4.14), and (4.15). Major errors such as the availability and acceptable CoD, availability, and property of mechanism of death, and the correct sequence of events leading to death. And, minor errors such as illegible handwriting, use of abbreviations, and the time interval between onset and death, were investigated in relation to characteristics of deceased from checked DNFs using the chi-squared test. The result shows that the hospital where

death had occurred was a statistically significant variable with all major errors which were found in DNFs, whereas other variables such as age and gender were not. For example, 46.43% of Shifa hospital DNFs had unacceptable CoD compared to non in Rantesy/ EL-Nasser Hospital. In addition, Shifa hospital DNFs had 36.04% proper mechanism of death compared to non in Rantesy/ EL-Nasser Hospital and, Shifa hospital DNFs had 42.59% correct sequence of events leading to death compared to non in Rantesy Hospital. Moreover, the finding reveals that both age of deceased and the hospital where death had occurred was a statistically significant variables with all minor errors which were found in DNFs. The differences in the major and minor errors between hospitals is may associated to lack of protocols, monitoring and supervision in the hospitals.

4.4 Results of other themes of qualitative analysis

4.4.1 Standards/ Protocol/ Guideline Availability

Through key informant interviews, on the open-ended question of how do you believe that most physicians the standards, protocol, and guidelines still require further development and need to be made more accessible, they were asked what they would suggest to improve the accuracy of DNF completion. There was a general consensus about the limited availability of standards, protocols, and guidelines.

The interviewees complained about the limited availability of standards, protocols, and guidelines, which affected the correctness and sequence of DNFs writing. They also cited a number of factors affecting the development of policies, procedures, protocols, and guidelines, including a lack of national standards for DNF documentation, the need for a unified, comprehensive, and structured national developing policies, procedures, protocols, and guidelines, and the lack of a unified, comprehensive, and structured national developing policies, procedures, protocols, and

Regarding the primary reason for the lack of policies, procedures, protocols, and guidelines, respondents agreed that they need to distribute a booklet on CoD certification to all physicians and post a laminated guideline in each physician's office. In addition, the medical staff must compile death certificates and photocopy the deceased's clinical records, including any available laboratory investigations for later analysis. They concurred with the statement that the DNF staff policies, procedures, protocols, and guidelines were lacking in a number of hospitals.

Consistent with previous research by Qaddumi et al. (2018), found that a lack of available standards/ protocols/ guidelines was the most common factor contributing to inaccurate death certification.

In accordance with a previous study conducted by Ali. & Hamadeh. (2013), 11.1% of participants were aware of the death certificate completion guidelines. However, 72 percent of respondents did not know what was required to complete a death certificate, and 98 percent did not know how to utilize the Bahraini coding system for causes of death. Furthermore, 83.1% of respondents attained a poor level and had not studied the manual's directions for preparing death certificates based on the criteria used to evaluate their performance.

Previous studies have shown that low coverage and noncompliance with WHO criteria lead to a wide range of mistakes, and this finding is in line with those findings (Gupta et al., 2014).

In conclusion, DNFs require guidelines for management and operations, which can be developed through business process mapping activities involving a review of strategic documents, SOPs, workflow diagrams, operational guidelines, manuals, and protocols, job descriptions of positions in the system and agreement between various stakeholders, performance monitoring reports, and international standards pertaining to DNFs under analphabetic.

4.4.2 Managerial Commitment

Qualitatively, the interviewees answered, they complaint the low managerial commitment and it was limited, this affected on writing sequence of death in the DNFs correctly and properly, and they stated many of factors affecting on managerial commitment such as ineffective mortality and morbidity committees, the clinical governance and leadership of mortality committees in different hospitals. Absence of guidance DNFs and absent of monitoring and reviewing with feedback from the managers and the head of departments in the hospitals.

Almost, in each pediatric hospital there was a mortality committee, but most of them were ineffective. One Senior Dr. Said:

> *" There is no guidance to educate them or to teach them how to write death notification forms and most hospitals have morbidity committees but they are ineffective."*

Even managers and heads of departments were muddled in finding comprehensive guidance to educate junior physicians. Because no general guidelines by the MOH were distributed. So, the education of proper writing was depending on senior experience and level of knowledge.

The finding of the current study is consistent with systematic literature review study by Makinde and et al., in (2020), found that the DNFs requires multisectoral implementation approaches, it potentially confers some challenges to performance measurement as multiple stakeholders.

Chapter Five

Conclusion and Recommendations

This is the first study to assess the completeness and accuracy of DNF data for infants among pediatricians in GS. The study adopted a mixed-methods approach to investigate the knowledge, attitudes, and factors that influence the correct documentation of death certificates. Thus, mixed-methods has attracted the attention of healthcare researchers since it professes to combine the benefits of qualitative and quantitative approaches. In order to improve the quality of infant mortality data in GS, the purpose of this study was to analyze the documentation of infant practices (DNF) among pediatricians working in health institutions.

5.1.1 Participants' knowledge and attitude

A self-administered questionnaire was used to collect data from 208 physicians in order to reach these conclusions. The majority of participants (65.3%) were between the ages of 30 and 55, and 80.3% (n=167) were males. Approximately one-third (30.3%) of physicians held a bachelor's degree, while the majority (69.7%) held post-graduate degree. The majority of doctors were neonatologists (78%) and nearly half were specialists (46.6%). 78.9% of respondents had general work experience in excess of ten years. The majority of participants (67.8%) had more than ten years of pediatrics work experience. However, 54.8% of them did not have training on DNF and CoD completion. Moreover, only 14.9% of those who received training believed it was adequate. In addition, the majority of participants, 76.4 percent, were uncertain as to whether or not the hospital has written policies or guidelines for completing the DNF and CoD.

Regarding physicians' knowledge, the responses to five distinct. infant deaths were evaluated based on the participants' knowledge of a) documenting an acceptable CoD, b) the correct mechanism of death, and c) the correct sequence of events. The results revealed that 25.48% of physicians failed to correctly identify the direct CoD, while 12.02% did so correctly, and that 30.29% of physicians failed to correctly identify the original disease underlying the CoD, while only 1.92% did so correctly. In general, the majority of physicians (65.26%) commit at least one serious error. Consequently, 62.5% of them made at least one significant error in determining the direct CoD. The highest percentage of major errors occurred when

determining the underlying disease that caused death, followed by determining the mechanism of death and the true sequence of death. Regarding minor errors, no DNF was devoid of a minor error. The most common minor error committed by physicians was the use of abbreviations and symbols, followed by illegible handwriting. In addition, the results revealed that the qualification, specialization, and salary of physicians were statistically significant variables in relation to their level of knowledge about DNF documentation practices. Still, total years of experience, the adequacy of the DNF and CoD training received, the availability of written policies on competing the DNF and CoD in the hospital, the managerial position of the physicians, the number of working hours per day, and the name of the working hospital were statistically significant factors associated with knowledge level.

Regarding the attitude of participants, the overall relative mean of physicians' attitude was 65.5%, which was categorized as fair.

5.1.2 Barriers influencing completing the infants' DNFs

Eleven questions were used to determine the barriers affecting the accuracy of completing infants' DNFs. The overall mean number of obstacles was 3.15±0.4. The complexity of infant diseases makes it difficult to identify the correct CoD. This was ranked as the most significant barrier to accurately completing infants' DNFs, followed by a heavy workload, inadequate training, and poor supervision. The lack of time to accurately complete the DNFs was ranked as the weakest barrier.

5.1.3 DNF evaluation.

Out of five hundred seventy-four DNFs, 439 met the eligibility criteria were observed and checked based on a data abstraction sheet. Of the DNFs, the mean age in days was 80.71 day with SD of 101.8 ranged from one day to 365 days. One third of the DNFs were from Al-Shifa Hospital and the males gender formed 61% of DNFs. The DNFs were evaluated for filling errors. About half of DNFs (44.7%) had unacceptable CoD. The majority (88.8%) of the DNFs had the mechanism of death, however, 25.3% were improper mechanisms of deaths. Moreover, 49.2%of the DNFs had incorrect sequence of events leading to death and 5% had multiple causes of death per line. When assessing DNFs for minor errors. There was no any DNF free of any minor error. The most frequently occurring minor error by

physicians was using of abbreviations which were used in about 34.1% of DNFs, followed by 34.6% of illegible handwriting, and not writing time intervals was seen in 64.7% of DNFs.

In general, the errors observed in this study's case scenarios are significantly lower than those observed in actual DNFs. Consequently, self-administrative questions may have permitted physicians to research the issues in order to deliver optimal responses or to seek assistance from experienced physicians.

5.1.4 Qualitative study

A total of ten pediatricians were interviewed. The primary concern of the researchers was to collect data from participants on the themes under investigation. The analysis discovered that the following factors influenced the correct completion of DNFs: a lack of training courses; a lack of monitoring, follow-up, and review DNFs; work stress and overload, as well as a lack of adequate time to deal with the child; a lack of knowledge and experience, a lack of awareness about the importance of DNFs, a lack of incentives and rewards, and a lack of a clear medical history.

5.2 Recommendation

5.2.1.1 Recommendations to policy makers

- Implement strategies for providing MCCoD training and education, such as training of trainers (TOT), direct training, online training, and basic training.
- Morbidity and mortality committee is supposed to present and discuss all death cases and check out the DNFs for each case and do frequent auditing.
- An educational seminar on death certification error, to be done routinely.
- Having workshops to discuss special cases and emphasize on how to write DNFs.
- Continuous reviewing and monitoring of DNFs by the head of the departments.
- A manual on death certification with instructions and guidelines should be developed.
- Decrease the work pressure and provide incentives and rewards to physicians who do good documentation.

5.2.1.2 Recommendations for pediatric physicians

- Physicians who engaged in documenting DNFs should complete relevant portions of the death certificate.
- It is the responsibility of the attending physician to determine the cause of death. Typically, he or she will both pronounce death and confirm to the cause of death.
- The physician should complete each item of the DNFs, following the specific instructions for that item.
- The physicians should not use abbreviations except those recommended in the specific item instructions
- Verify the spelling of the deceased's name with the informant and write it in a readable font.
- Exact date and time of death should be written in a clear font

5.2.2 Recommendation for further research

- Conduct study to investigate the quality of adult DNFs.
- Conduct additional research studies to substantiate the existing findings with a large sample size at the national level
- Conduct the same study from the perspective of nurses to determine what role they played and what impact their participation had on their profession, as well as how involved they were in the communication dynamics.
- Conduct the same study concerning the perspective of relatives of the deceased, and highlight their perceptions of DNFs.

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Annexes

Annex (1): Palestine map

Annex (2): Gaza Strip map

Annex (3): Abstraction sheet on Excel

	Item		**Item**
•	Number	•	Immediate CoD (Available or Not-availabe)
•	DNF code	•	Immediate CoD (Right or wrong)
•	Sex	•	Undelying CoD (Available or Not-availabe)
•	Age	•	Mechanism of death (Right or wrong)
•	Residential address	•	ICD-10 for the Undelying CoD (Available or Not-availabe)
•	Date of birth	•	ICD-10 for the Undelying CoD (Right or wrong)
•	Date of admission	•	Correct sequence of events leading to death (Yes or No)
•	Date of death	•	Multiple causes of death per line (Yes or No)
•	Place of death/ hospital	•	Illegible handwriting (Yes or No)
•	Place of death/ Department	•	Use of abbreviations (Yes or No)
•	Time interval (Yes or No)		

Annex (4): Questionnaire in Arabic

Serial No: (……)

عزيزي المشارك/ـة.....

السلام عليكم ورحمة الله وبركاته

أنا الطالبة/ مها زياد جربوع، طالبة ماجستير في كلية الصحة العامة جامعة القدس/ مسار علم الأوبئة. أنا أعمل على أطروحة الماجستير الخاصة بي والتي تعد مطلبًا لإكمال برنامج الماجستير في الصحة العامة.

يطيب لي أن أتقدم بخالص شكري ومحبتي لكم على مشاركتكم في بحثي العلمي الذي يحمل عنوان:

"Documentation Practices of Infants' Death Notification Forms among Pediatric Physicians working in Health Facilities in the Gaza Strip"

إن هذا البحث هو متطلب أساسي من دراستي لاستكمال رسالة الماجستير بعنوان: "توثيق ممارسات نماذج التبليغ بوفاة الأطفال بين أطباء الأطفال العاملين في المرافق الصحية في قطاع غزة"

وقد تم ترشيحك من بين مجموع المشاركين في هذه الدراسة لتعبئة الاستبيان المتعلق بالدراسة.

في حالة موافقتك على قبول المشاركة في هذا البحث، يرجى التفضل بالإجابة على أسئلة الاستبيان بموضوعية لأنها تستخدم في إظهار نتائج البحث والاقتراحات التي قد يقدمها الباحث، مع التأكيد على أن هذه البيانات سرية تمامًا وستبقى كذلك لأغراض البحث العلمي.

موافق☐ غير موافق☐

ملاحظة / يستغرق استكمال الاستبيان حوالي 40 دقيقة.

شكرا لتعاونكم ومشاركتكم الجميلة

الباحثة/ مها جربوع

التاريخ (.....)

الرقم التسلسلي (.....)

الجزء الأول: الخصائص الاجتماعية /الديموغرافية:

1.	الجنس	□ ذكر			□ أنثى	
2.	العمر					
3.	المؤهل العلمي	□ بكالوريوس	□ ماجستير	□ دكتوراة	أخرى/حدد.....	
4.	المسمى	□ مقيم		□مختص		
5.	التخصص	□ باطنة	□ طب أطفال	□ طب جراحي	□ تخصصات أخرى	
6.	المسمى الوظيفي	□ ممارس	□ رئيس القسم	□ مشرف فترة	□ أخرى/حدد	
7.	مكان العمل	□ المستشفى.....		□ القسم		
8.	الراتب بالشيكل					
9.	عدد ساعات العمل/باليوم	أقل أو يساوي 8 ساعات □		أكثر من 8 ساعات □		
10.	عدد سنوات الخبرة بالعمل	عدد السنوات/.....				
	عدد سنوات العمل مع الأطفال	عدد السنوات/.....				
11.	تلقيت تدريبًا على إكمال شهادات الوفاة ومعرفة سبب الرئيسي للوفاة	□نعم □لا إذا نعم، هل كان التدريب: □ كاف □غير كاف □ غير متأكد				
12.	هل يوجد لدى المستشفى سياسات أو أدلة مكتوبة حول آلية كتابة شهادة الوفاة بشكل صحيح ؟	□غير متأكد □غير كاف □كاف				
13.	هل أنهيت كتابة شهادة الوفاة سابقا؟	□ نعم	□لا			

الجزء 2: المواقف تجاه ممارسات التوثيق.

المواقف تجاه:	لا أوافق بشدة	لا أوافق	متعادل	أوافق	أوافق بشدة
اعتقد إنها مسؤوليتي المهنية الكاملة لكتابة سبب وإكمال شهادة الوفاة بدقة.					
أعتقد أنني قادر على اتباع ممارسات التوثيق الموصي بها لكتابة سبب الوفاة واكمال شهادة الوفاة					
أعتقد أن اتباع الدليل الارشادي لاستكمال شهادة الوفاة سيقلل من معدل الأخطاء داخل الشهادة					

المواقف تجاه:	لا أوافق بشدة	لا أوافق	متعادل	أوافق	أوافق بشدة
أعتقد أن اتباع الدليل الارشادي لاستكمال شهادة الوفاة سيحسن جودة إحصاءات الوفيات.					
أعتقد أن اتباع الدليل الارشادي لاستكمال شهادة الوفاة سيساعد صانعي القرار على تحديد الأسباب الرئيسية للوفاة بشكل صحيح					
أعتقد أن اتباع الدليل الارشادي لاستكمال وتعبئة شهادة الوفاة هو إضاعة للوقت					
أعتقد أن كتابة أكواد أسباب الوفاة بدقة وفقًا ل التصنيف الدولي للأمراض (ICD-10) غير مجدية					
يمكن لأي شخص في الفريق الصحي مثل الممرضات أو السكرتير الطبي إكمال شهادة الوفاة بشكل صحيح بدلاً من إجبار الأطباء على القيام بذلك					
أعتقد أن الجهات المانحة هم الوحيدون الذين يمكنهم الاستفادة من المعلومات داخل شهادات الوفاة					

الجزء 3: العوامل المؤثرة على استكمال نماذج الإخطار بوفاة الرضع بدقة

يرجى الترتيب من 5 (أهم عائق) إلى 1 (العائق الأقل أهمية)

العوامل المؤثرة في استكمال نماذج الإخطار بوفاة الرضع بدقة	5	4	3	2	1
الأدلة الارشادية لاستكمال شهادة الوفاة غير كافية					
التوجهات السلبية وعدم اهتمام الأطباء تجاه أهمية استكمال شهادات الوفاة.					
معظم الأطباء لم يتلقوا تدريبًا كافيًا على إكمال شهادات الوفاة وأسبابها بدقة.					
الأطباء يكرهون ممارسات التوثيق					
الافتقار إلى الحافز، مثل خطاب التقدير أو جائزة المستشفى للأطباء الأكثر تفانيًا الذين يكملون دائمًا شهادات الوفاة بدقة.					
عدم كفاية البيانات الطبية للمريض وتاريخ المريض في السجل الطبي للمريض.					

تصميم شهادة الوفاة ليس سهل الاستخدام.					
عبء العمل الكبير للأطباء يعيق تكملة شهادات الوفاة بدقة					
ضعف الإشراف والمتابعة من قبل إدارة المستشفيات على الامتثال باستكمال شهادات الوفاة					
تعقيد أمراض الرضع يجعل من الصعب تحديد سبب الوفاة الصحيح					
ضيق الوقت يمنع الأطباء من استكمال شهادات الوفاة بدقة					

الجزء 4: معرفة ممارسات التوثيق الصحيحة

(سيناريو الحالة وإجابتها النموذجية)

من فضلك لديك (5) سيناريوهات حالة وفاة، يرجى إجابة السيناريوهات لملئ إشعار الوفاة

الحالة الأولى	التشخيص	سبب الوفاة
تم إدخال رضيع يبلغ من العمر 10 أشهر إلى المستشفى مصابًا بالتهاب السحايا والدماغ لمدة يومين، وصدمة إنتانية، ويعاني من فشل تنفسي، وكان تحت جهاز التنفس الصناعي، وتم حقنه وريديا بالدوبامين والدوبيوتامين. كان يعاني من نقص السكر في الدم ونقص الصفيحات الدموية، وانخفاض PT، وPTT ثم بعد يومين أصيب بنزيف رئوي ثم سكتة قلبية وتوفي.		السبب المباشر للوفاة (أ) نتيجة من (ب) نتيجة من (ج) ناتج عن المرض الأصلي (د)
الحالة الثانية	التشخيص	سبب الوفاة
تم إدخال طفلة عمرها يومين إلى المستشفى بسبب ضيق في التنفس، وكشفت CXR عن ترشيح سوائل في الرئتين، تدهور وضع الحالة وتبين وجود تعفن الدم وفشل أعضاء متعددة، وبعد يومين أصيب بالسكتة القلبية وفشل الإنعاش القلبي الرئوي ثم توفيت		السبب المباشر للوفاة (أ) نتيجة من (ب) نتيجة من (ج) ناتج عن المرض الأصلي (د)
الحالة الثالثة	التشخيص	سبب الوفاة
37 يومًا من العمر، تُعرف هذه الرضيعة بأنها مصابة بأمراض القلب المعقدة المزرقة ومتلازمة فينيل كيتون		السبب المباشر للوفاة (أ) نتيجة من (ب)

وموصوف لها تركيبة غذائية خاصة. تم إدخالها إلى المستشفى مع علامات صدمة قلبية. على الرغم من الإنعاش القلبي الرئوي، أصيبت بتوقف القلب والجهاز التنفسي بعد 6 ساعات وتوفيت.		نتيجة من (ج) ناتج عن المرض الأصلي (د)
الحالة الرابعة	التشخيص	سبب الوفاة
طفلة عمرها 9 شهور، تم تشخيصا بإنها مريضة سكري من النوع الأول على إنسولين، دخلت المشفى بحالة تهيج وسرعة التنفس التنفسي استمر لمدة 24 ساعة، وتم إدخالها إلى وحدة العناية المركزة، هناك بدأت معالجة الحماض الكيتوني السكريDKA، لكنها كانت تعاني من تدهور في مستوى الوعي وعلى الرغم من محاولات العلاج تدهورت الحالة وأصيبت بوذمة دماغية وتوقف القلب بعد 3 أيام وتوفي		السبب المباشر للوفاة (أ) نتيجة من (ب) نتيجة من (ج) ناتج عن المرض الأصلي (د)
الحالة الخامسة	التشخيص	سبب الوفاة
رضيع ذكر يبلغ من العمر 9 أشهر، يعاني من فقدان الوعي، ووضعية دماغيةdecerebration، ولديه عدة بقع حمراء وكدمات زرقاء على امتداد الجسم، لوحظ منذ 3 أيام. أظهرت نتيجة فحص الدم الشامل عن وجود انخفاض شديد لنسبة الصفائح الدموية غير معروف السبب، بعد ساعات قليلة أصيب بسكتة قلبية تنفسية وتوفي.		السبب المباشر للوفاة (أ) نتيجة من (ب) نتيجة من (ج) ناتج عن المرض الأصلي (د)

Annex (5): Questionnaire

Dear participant .....

I am Maha Zyad Jarbouh, a master's student at the Faculty of Public Health, Al-Quds University, Epidemiology track. I am working on my master's thesis which is a prerequisite to complete the master's degree in public health.

It gives me great pleasure to extend my sincere thanks and love to you for your participation in my scientific research entitled:

"Documentation Practices of Infants' Death Notification Forms among Pediatric Physicians working in Health Facilities in the Gaza Strip"

You have been nominated from among the total number of participants in this study to fill out the questionnaire related to the study.

If you agree to accept participation in this research, please kindly answer the questionnaire questions objectively because they are used to show the results of the research and suggestions that the researcher may take, emphasizing that this data is completely confidential and will remain so for scientific research purposes.

OK □ Not OK □

Note / It takes about 40 minutes to complete the questionnaire.

Thank you for your cooperation and beautiful participation

Researcher / Maha Jarbou

Part 1: Socio Demographic Characteristics

1	Gender	□ Male	□ Female
2	Age		
3	Qualification.	□ Bachelor □ Master □ Doctorate □ other/specify	
4	Specialization	□Resident □Specialist	
5	Specialty	□Medicine □Surgical □Pediatric □other	
6	Position.	1. practitioner 2. Head of the department 3. senior 4.other(specify)	
7	Department.	□Hospital…….. □ ward …….	
8	Salary (NIS)	…….	
9	Working hours/day	□ ≤ 8 hours/day	□ ≥8 hours/day
10	Total Years of Work Experience	..... Years	
	Total Years of Work with pediatrics	……. Years	
11	Have received training on completing the DNF and CoD	□ Yes □ No If Yes, Adequacy of the training received □ Adequate □ Inadequate □ Uncertain	
12	The hospital has a written policies/guideline on competing the DNF and CoD	□ Uncertain □ Yes □No	
13	Have you ever completed the DNF	□ Yes □No	

Part 2: Attitudes towards documentation Practices.

Attitudes towards	SD	D	N	A	SA
It is my professional responsibility to complete the DNF and accurately write the COD					
I believe that I am able to follow the recommended documentation practices of completing the DNF and COD					
I believe that following the guideline of completing the DNFs will reduce rate of errors within the DNF					
I believe that following the guideline of completing the DNFs will improve the quality of mortality statistics					
I believe that following the guideline of completing the DNFs will help the decision makers to properly identify the leading causes of death					
I believe that following the guideline of completing the DNF is time wasting					
I believe that writing the CoD codes according to the ICD-10 is useless.					
Anyone in the health team such as nurses or medical secretary can properly complete the DNF instead of enforcing the doctors to do that					
I think the donors are the only one who can benefit from the information within the DNFs.					

Part 3: Influencing factors towards completing the infants' death notification forms accurately

Please rank from 5 (the most important barrier) to 1 (the least important barrier)

Influencing factors towards completing the infants' death notification forms accurately	5	4	3	2	1
The policy/ guideline of completing the DNFs are inadequate					
Negative perception from doctors toward the importance of completing the DNF..					
Most of the doctors had insufficient training on completing the DNFs and CoD accurately.					
Doctors dislike the documentation practices.					
Lack of motivation e.g letter of appreciation or hospital award for the most dedicated doctors who always complete the DNF accurately					
Inadequate patient medical data and patient history in the patient's medical record .					

The design of the DNFs is not user-friendly.					
The high workload hinders doctors from completing the DNFs accurately					
There is poor supervision and follow up from hospitals management on the compliance					
The complexity of infant diseases make it is difficult to identify the right cause of death.					
The lack of time hinders doctors from competing the DNFs accurately					

Part 4: Knowledge on right documentation Practices

(Case scenario and its model answer)

Please you have 5 death case studies we ask to fill the death notification

Case 1:	**Diagnosis**	**Cause of Death**
10-month-old infant was admitted to hospital with meningoencephalitis for 2 days, septic shock, he has respiratory failure and he was under mechanical ventilator, on dopamine and dobutamine. He had persistent hypoglycemia & prolonged PT, & PTT with thrombocytopenia, then two days later he developed pulmonary hemorrhage then cardiac arrest and died.		Direct cause of death (a) Resulting from (b) Resulting from (c) The original cause of death (d)
Case 2:	**Diagnosis**	**Cause of Death**
A female neonate , two days old, was admitted to hospital with respiratory distress, CXR revealed respiratory infiltration, but the course complicated with sepsis, multiple organ failure, Two days later , he developed cardiac arrest & failed CPR then she died		Direct cause of death (a) Resulting from (b) Resulting from (c) The original cause of death (d)
Case 3:	**Diagnosis**	**Cause of Death**
37 days old, a female infant is known case of cyanotic complex heart disease & phenylketonuria & on special formula. She was admitted to hospital with signs of cardiogenic shock. Despite CPR she had cardio-respiratory arrest after 6 hours & died.		Direct cause of death (a) Resulting from (b) Resulting from (c) The original cause of death (d)
Case 4:	**Diagnosis**	**Cause of Death**
. 9 months female patient known case of on insulin therapy, admitted with		Direct cause of death (a) Resulting from (b)

irritability and rapid respiratory breathing for 24 hours, and admitted to ICU, there started management of DKA, but she had deterioration of conscious level & despite the management of brain oedema and develop cardiac arrest after 3 days and died		Resulting from (c) The original cause of death (d)
Case 5:	**Diagnosis**	**Cause of Death**
9-month-old, male infant presented with loss of consciousness, decerebrate position, he has multiple petechia and ecchymosis, noticed 3 days ago. CBC revealed a picture of ITP, few hours later he developed cardio respiratory arrest and died.		Direct cause of death (a) Resulting from (b) Resulting from (c) The original cause of death (d)

Thanks for your participation.

Annex (6): Semi structured in-depth interviews questions

1- In general, how can you evaluate the documentation practices among pediatric physicians? How this affect the quality of DNFs?
2- In your opinion, to which extent the pediatric physicians complete the DNFs accurately? What are the main factors influencing their compliance with completing the DNFs accurately?
3- Do you think that most of physicians still need more training on how to compete the DNFs accurately? How can such training be practically invested to ensure the competing of DNFs accurately?
4- Discuss he role of the hospital management, supervisors, and head of departments in ensuring a complete and accurate DNF? To which degree they are supportive? What can be done more by the them?
5- Do you think that providing the physicians with regular feedback on the main causes of infant deaths can enhance completing the DNFs accurately? How this can be successful?
6- In your opinion, how can the regular audit of DNFs can improve the completion if DNFs accurately? Who can do this job and how?
7- How can you explain the high positive attitude among pediatric physicians toward completing the DNFs accurately?
8- How can you explain that the "**complexity of infant diseases** make it is difficult to identify the right cause of death was ranked as the first barrier influencing completing the infants' DNFs accurately, followed by the **high workload,** and **Insufficient training**?
9- How can you explain that most of physicians filed to correctly identify the immediate, underlying cause of infant death, and the sequence of infant deaths (for the 5 scenarios)?
10- What you suggest to improve the completion DNFs accurately?
11- Are there any other issues regarding completion DNFs accurately that you would like to discuss?

Annex (7): List of experts (arbitrators)

No.	Name	Specialty	Affiliation
1.	Dr. Yahia Abed	Faculty member and coordinator of the epidemiology program	Al- Quds University
2.	Dr. Ashraf Aljadi	Dean of the College of Nursing	Islamic university
3.	Dr. Sawsan Shorab	Head of the Pediatric Department (3), Al-Nasr Al-Rantisi Hospital	MoH
4.	Dr. Sheren Abed	Head of the nursery department Consultant Pediatrician	MoH
5.	Mr. Jehad Okasha	Director of the Scientific Research Department	MoH
6.	Dr. Hamza Abdeljawad	Nursing Program Coordinator	Al- Quds University
7.	Dr. Mazan Abo Gamer	Head of the nursing department	Al Azhar University
8.	Dr. Ayman Alsous	General administration for planning and policy making	MoH
9.	Dr. Khalid Khadoura	Assistant Professor of Public Health	Islamic and Isra University
10.	Dr. Samer Abozer	Assistant Professor of Public Health	University College of Science and Technology
11.	Dr Ayman Alzahar	Head of the Pediatric Intensive Care Department	MoH
12.	Dr. Mohamed Aljerjawi	Nursing Director of the Mental Health Hospital	MoH

Annex (8): Al-Quds University Approval

Al-Quds University
Jerusalem
School of Public Health

جامعة القدس
القدس
كلية الصحة العامة

التاريخ:2021/11/9

حضرة المهندس/ اسامة قاسم المحترم
الوكيل المساعد-وزارة الصحة

تحية طيبة وبعد...

الموضوع: مساعدة الطالبة مها زياد جرادع

نشكر لكم دعمكم الدائم لمسيرة العلم والتعليم وخصوصاً دعم كلية الصحة العامة وطلابها، ونود أعلامكم بأن الطالبة المذكورة أعلاه تقوم بعمل بحث كمتطلب للحصول على درجة الماجستير في الصحة العامة/مسار علم الأوبئة بعنوان:

"Documentation Practices of Infants' Death Notification Forms among Pediatric Physicians working in Health Facilities in the Gaza Strip"

وعليه نرجو من سيادتكم التكرم بالموافقة على تسهيل مهمة الطالبة في إنجاز هذا البحث حيث أن الفئه المستهدفة هم جميع أطباء الأطفال العاملين في المستشفيات الحكومية. علماً بانه سيتم جمع المعلومات من خلال استبانة تم اعدادها وايضا استخدام الملفات الشخصية المتعلقة بجميع البيانات النوعية، بالاضافة إلى الاستعانة بالبيانات المؤرشفة في قاعدة مركز نظم المعلومات الصحي الفلسطيني التابع لوزارتكم الموقرة .

و اقبلوا فائق التحية و الاحترام...

د. بسام أبو حمد
منسق عام برامج الصحة العامة
فرع غزة

نسخة
- الملف

Annex (9): Helsinki Approval

المجلس الفلسطيني للبحث الصحي
Palestinian Health Research Council

تعزيز النظام الصحي الفلسطيني من خلال مأسسة استخدام المعلومات البحثية في صنع القرار
Developing the Palestinian health system through institutionalizing the use of information in decision making

Helsinki Committee
For Ethical Approval

Date: 2021/08/02 **Number:** PHRC/HC/941/21

Name: Maha zyad jarbouh الإسم:

We would like to inform you that the committee had discussed the proposal of your study about: نفيدكم علماً بأن اللجنة قد ناقشت مقترح دراستكم حول:

Documentation Practices of Infants' Death Notification Forms among Pediatric Physicians working in Health Facilities in the Gaza Strip

The committee has decided to approve the above mentioned research, Approval number PHRC/HC/941/21 in its meeting on 2021/08/02 و قد قررت الموافقة على البحث المذكور عاليه بالرقم والتاريخ المذكوران عاليه

Signature

Member **Member**

Chairman

Genral Conditions:-
1. Valid for 2 years from the date of approval.
2. It is necessary to notify the committee of any change in the approved study protocol.
3. The committee appreciates receiving a copy of your final research when completed.

Specific Conditions:-

Annex (10): Palestinian Ministry of Health Approval

State of Palestine
Ministry of health

دولة فلسطين
وزارة الصحة

السيد : جهاد عبدالقادر عكاشه المحترم

التاريخ:11/11/2021
رقم المراسلة 817132

مدير دائرة /الإدارة العامة للوحدات الإدارية المساعدة /وزارة الصحة

السلام عليكم ,,,

الموضوع/ تسهيل مهمة الباحثة مها أبو طعيمة

التفاصيل //
السلام عليكم
نهديكم أطيب التحيات ونود منكم بخصوص الموضوع أعلاه، يرجي تسهيل مهمة الباحث/ة مها زياد نمر طعيمه الملتحق/ة ببرنامج ماجستير علم الأوبئة- جامعة القدس أبو ديس في إجراء بحث بعنوان

Documentation Practices of Infants' Death Notification Forms among Pediatric Physicians' working in Health Facilities in the Gaza Strip

حيث الباحث/ة بحاجة لتعبئة استبانة عشوائية لعدد من أطباء الأطفال في مرافق وزارة الصحة (المستشفيات)، بما لا يتعارض مع مصلحة العمل وضمن أخلاقيات البحث العلمي، ودون تحمل الوزارة أي أعباء أو مسئولية

وتفضلوا بقبول التحية والتقدير،

ملاحظة / تسهيل المهمة الخاص بالدراسة أعلاه صالح لمدة 3 أشهر من تاريخه.

علي حسن البلبيسي
حكيم جامعي

Abstract in Arabic

عنوان الرسالة: "توثيق ممارسات نماذج التبليغ بوفاة الأطفال بين أطباء الأطفال العاملين في المرافق الصحية في قطاع غزة".

إعداد الباحثة: مها زياد نمر جربوع

إشراف الدكتور: محمود رضوان

الملخص:

الخلفية: نماذج الإخطار بالوفاة الكاملة والدقيقة هي مكون مركزي يشير إلى إحصائية قوية للوفيات. هدفت هذه الدراسة إلى التحقق من توثيق ممارسات شهادات الوفاة للأطفال الرضع بين أطباء الأطفال العاملين في المرافق الصحية في قطاع غزة.

الطرق: استخدمت هذه الدراسة تحليل شهادات الوفاة بأثر رجعي ، والطرق الوصفية المقطعية ، والطرق التفسيرية المتسلسلة المختلطة. قبل جمع البيانات الفعلية ، أجريت دراسة تجريبية مع 20 طبيبًا واستُبعدت بياناتها من التحليل النهائي. قامت الباحثة بجمع وتحليل البيانات الكمية. ثم أجريت مقابلات لشرح النتائج الكمية. في المرحلة الأولى ، استخدمت الدراسة النهج الكمي بين 316 طبيبًا. حيث تم تقديم استبيان ذاتي لاستكشاف المعرفة والمواقف والعوامل التي تؤثر على ممارسات التوثيق الصحيحة لـشهادات الوفاة. وفي المرحلة الثانية ، تم استخراج جودة بيانات شهادات الوفاة عبر ورقة تجريد البيانات التي طورها الباحث. تمت ملاحظة (439) لمدة عام أو أقل وتقييمه بناءً على إرشادات منظمة الصحة العالمية. اثنان من أطباء الأطفال المدربين تدريباً عالياً استخرجوا البيانات الطبية وحددوا سبب الوفاة ، وتمت استشارة خبير ثالث إذا اختلف طبيب الأطفال. تم إجراء دراسة نوعية باستخدام المقابلات المتعمقة واستبيان شبه منظم مع عشرة متخصصين تم اختيارهم بشكل مقصود في المرحلة الثالثة. و تم استخدام برنامج الحزمة الإحصائية للعلوم الاجتماعية من أجل تحليل البيانات.

النتائج: تم التوصل إلى النتائج بعد جمع البيانات من 208 طبيب ، و تحليل 439 شهادة وفاة، وإجراء مقابلات مع عشرة أطباء أطفال. من بين الأطباء الـ 208 ، تراوحت الفئة العمرية الرئيسية من 30 إلى 55 عامًا وشكلت 65.3٪ من المشاركين و 80.3٪ من الذكور. بلغ مستوى معرفة المشاركين حول إكمال شهادات الوفاة 58.5% مما يشير إلى عجز في المعرفة ، ومع ذلك ، فإن موقفهم هو 82.8٪ والذي يعتبر إيجابيًا. بشكل عام ، ارتكب معظم الأطباء (65.26٪) خطأً جسيمًا واحدًا على الأقل. وبالتالي ، فإن تحديد المرض الأصلي الذي يكمن وراء سبب الوفاة كان أعلى نسبة (67.79٪) من الأخطاء الجسيمة.

فيما يتعلق بالأخطاء الطفيفة ، لم يكن هناك شهادات خالية من أي أخطاء بسيطة. كان الخطأ البسيط الأكثر تكرارا من قبل الأطباء هو استخدام الاختصارات والرموز (74.52٪). كانت أعلى ثلاث موانع مرتبة والتي تؤثر على استكمال إخطارات وفاة الرضع هي مدى تعقيد أمراض الرضع (المتوسط = 4.18) ، وعبء العمل المرتفع (المتوسط = 3.7) ، والتدريب غير الكافي (المتوسط = 3.6).

علاوة على ذلك ، مجموع سنوات الخبرة(دلالة إحصائية = 0.0009) ، وكفاية تلقى التدريب عن كتابة شهادات الوفاة (دلالة إحصائية= 0.030) ، وتوافر سياسات مكتوبة على منافسة شهادات الوفاة في المستشفى (دلالة إحصائية= 0.0001) ، والوظيفة الإدارية للأطباء (دلالة إحصائية =0.0004)، ، المؤهلات (دلالة احصائية = 0.0001) ، والراتب (دلالة احصائية = 0.0009) عوامل أثرت بشكل ايجابي على معرفة الأطباء. و قد أثرت ساعات العمل في اليوم بشكل عكسي(دلالة إحصائية= 0.002) ، كما كان لاسم المستشفى أيضا تأثير على المعرفة لدى الأطباء (دلالة احصائية = 0.0001). 15.9٪ من شهادات الوفاه التي تم مراجعتها كان لديها آليات غير دقيقة للوفاة ، 49.2٪ لديها تسلسل غير مناسب للأحداث التي أدت إلى الوفاة ، و 5٪ لديها أسباب متعددة للوفاة.

فيما يتعلق بالدراسة النوعية ، نتجت الدراسة أن هناك سبعة موضوعات رئيسية عملت كعوامل تؤثر على الاستكمال الصحيح للإطار الوطني المحدد وهي: تدريب الموظفين ، والمراقبة والإشراف ، ووقت الموظفين وعبء العمل ، والالتزام الإداري ، والحوافز والدعم ، ومعرفة الأطباء وسلوكهم.

الخلاصة والتوصيات: جاءت نتائج الدراسة الكمية منسجمة مع النتائج النوعية. مستوى معرفة الطبيب ضعيف مع الموقف الإيجابي حول الانتهاء من توثيق شهادات الوفاة .معظم الأطباء قام بعمل خطأ كبير واحد على الأقل . المزيد من الدورات التدريبية ، ومراقبة المشرفين ، وورش العمل حول كيفية كتابة شهادات الوفاة وكيفية استخدام .ICD10 يُنصح بتقليل ضغط العمل وتقديم الحوافز والمكافآت للأطباء الذين يقومون بالتوثيق الجيد.

الكلمات المفتاحية: نماذج الإخطار بالوفاة ، المعرفة ، الموقف ، الممارسات ، العوائق ، الأخطاء