

**FACTORS ASSOCIATED WITH THE IMPLEMENTATION OF HELPING BABIES
BREATHE GUIDELINES AMONG SKILLED BIRTH ATTENDANTS IN HEALTH
FACILITIES IN DAR-ES-SALAAM**

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By

Tsafu Gaalu

**A Dissertation Submitted in (partial) Fulfillment of the Requirement for the Degree of
Masters of Science (Midwifery and Women's Health) of**

Muhimbili University of Health and Allied Sciences

October 2020.

CERTIFICATION

The undersigned certify that they have read and hereby recommend for acceptance by the Muhimbili University of Health and Allied Sciences a dissertation titled: Factors associated with the Implementation of Helping Babies guidelines among skilled birth attendants in health facilities in Dar es Salaam in (partial) fulfillment of the requirements for the degree of master of Science (Midwifery and Women’s Health) of Muhimbili University

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Date _____

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(Co- Supervisor)

Date _____

DECLARATION AND COPYRIGHT

I, Tsafu Gaalu declare that this dissertation is my own original work and that it has not been presented and will not be presented to any other university for a similar or any other degree award.

Signature..... Date.....

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Lastly, I would like to thank all peoples in one way or another who assisted me in the write up of this document.

DEDICATION

I dedicate this dissertation to my beloved husband Mr. E. Msechu, my children and my supervisors.

ABSTRACT

Background: The practice of Helping Babies Breathe (HBB) reduces neonatal death due to birth asphyxia. Globally each year, birth asphyxia results in 1.2 million stillbirths, also it is approximated that 10 million babies cannot take breathe by themselves and need assistance, therefore, all skilled birth attendants (SBAs), including physicians, midwives and nurses ought to be trained on HBB in order to equip them with competences required in initial neonatal resuscitation.

Broad objective: To determine factors associated with the implementation of HBB guidelines adherence in initial newborn resuscitation among SBAs working in maternity units in health facilities in Dar-es-Salaam region.

Materials and Method: A descriptive cross-sectional study design was applied and the study took place in five selected health facilities; Amana, Temeke, Mwananyamala, TMJ and Kairuki hospitals in Dar-es- Salaam region. The study population was nurses and midwives working in maternity units (labour, antenatal and postnatal wards) with the sample size of 133, out of whom 132 responded to the questionnaires. Probability proportional sampling was used to select participants from five selected health facilities and from each health facility; the participants obtained using convenient sampling. Data collected by using pre-tested self-administered questionnaires and were analyzed using SPSS version 25. The associations between variables tested by using, frequency distribution, Chi square test and logistic regression.

Results: The majority of respondents 54(40.9%) had the age between 26 and 35, married 89(67.4%), female 112(84.8%) and had completed the certificate level of education 54(40.9%). Most of BAs were working in the labor ward 56(42.4%). Of the 132 respondents, 83.3% (n=110) were trained on the HBB. However, 45(34.1%) adhere to guideline in initial newborn resuscitation. Training on HBB (P value 0.049), documentation of HBB resuscitation outcome (P value 0.025) and integration of HBB to EmONC (P value 0.028) had shown significant association with adherence to the guideline by multivariate analysis.

Conclusion: HBB guideline adherence in initial newborn resuscitation depends largely on training of all SBAs and proper documentation of HBB resuscitation outcome. To improve the outcomes of resuscitated babies, we need well-experienced Birth Attendants who are competent and confident in performing neonatal resuscitation during golden minute.

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LIST OF ABBREVIATIONS

AAP	American Academy of Pediatrics
AMO	Assistant Medical Officer
BAS	Birth attendants skilled
CEmONC	Comprehensive Emergency and Obstetric & Neonatal Care
CO	Clinical Officers.
DSM	Dar- es- Salaam
EmONC	Emergency and Obstetric & Neonatal Care
HBB	Helping Babies Breathe
HCPs	Health Care Providers
HCW	Health Care Workers
HMIS	Health Management Information System
MICS	Multiple Indicators Cluster Survey
NMR	Neonatal mortality rate
OSCE	Objective structured clinical examination
QA	Quality Assurance
QI	Quality Improvement
TDHS	Tanzania Demographic and Health Survey

DEFINITION OF TERMS

American Academy of Pediatrics	Is an organization of pediatricians, pediatric medical subspecialists and pediatric surgical specialist (Helping Babies Breathe Global Implementation Taskforce, 2011)
Health Care Provider	Is an individual may be a health care professional within medicine, nursing, or allied health professions (Tanzania Health policy Version, 2017)
Helping Babies Breathe	Helping Babies Breathe is a global educational program in neonatal resuscitation for birth attendants in resource limited settings initiated by the American Academy of Pediatrics (AAP). (Helping Babies Breathe Global Implementation Taskforce, 2011)
Implementation	Is the action of putting something into operation or, the process of putting a decision or plan into effect (Oxford Dictionary, 2015)
Initiative	A new plan or process to achieve something or solve a problem: the ability to make decisions and take action without waiting for someone to tell you what to do.
Intrapartum	Is the period from the onset of labor to the end of the third stage of labor ('ANC guideline, 2017)
Knowledge	Means knowing or all that a person knows.
Neonatal mortality rate	Is the number of neonatal deaths per 1000 live births ('ANC guideline, 2017)
Practice	means doing something regularly in order to be able to do it better or to perform or work at repeatedly so as to become proficient or something that is usually or regularly done, often as a habit, tradition, or custom.
Skill	Means the ability to do something well (Oxford Dictionary,2015)
Stillbirth	Is the death or loss of a baby before or during delivery ('ANC guideline, 2017).

KEY WORDS

Helping babies breathe focuses on the golden minute when stimulation to breathe and ventilation to bag and mask can save a life of a baby. When a baby is born, he or she has 60 seconds in which to start breathing.

Birth asphyxia is the inability of a newborn baby to breathe immediately after birth.

Skilled Birth attendants or skilled birth attendants is a health professional who provides basic and emergency care to women and their newborns during pregnancy, childbirth, and the postpartum period. A birth attendant, who may be a midwife, or nurse, trained to be present at childbirth.

Golden minute is the first 60 seconds of a newborn baby's life

Neonatal resuscitation is intervention after a baby is born to help it breathe and to help its heart beat.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Helping Babies Breathe (HBB) is a global practical hands-on educational programme for basic neonatal care and resuscitation specifically designed for places where human and technical resources are limited. It was initiated by the American Academy of Pediatrics (AAP) and launched in 2010, with an overall vision to train large numbers of birth attendants worldwide using a cascade model to ensure that all babies are born with a skilled birth attendant present (Ersdal, 2018). In addition, this happened in response to the Millennium Development Goal (MDG) 4 which was to reduce under-5-year child mortality by two-thirds between 1990 and 2015 (Ersdal, 2018). By 2015, the MDG 4 was not met because the neonatal mortality rate only decreased by 40%, from 4.7 to 2.8 million. Due to the slow decline of the MDG 4 which ended in 2015, the Sustainable Development Goal (SDG) targets 3.2 was developed with its strategies aiming at reducing new-born deaths at least to 12 deaths per 1000 live births by 2030 (TDHS, 2015/2016).

The key concept of HBB is the Golden Minute, which means that within one minute of birth a baby should be breathing well or ventilated with a bag and mask. The Golden Minute identifies the steps that births attendants must take immediately after birth to evaluate the baby and stimulate breathing. HBB guideline provides basic instruction on initial steps in newborn resuscitation, such as drying and rubbing the baby for tactile stimulation; clearing the airway and using bag and mask ventilation methods to help a non-responsive baby to breathe. HBB guideline prepares birth attendants to care for healthy newborns and those who are not breathing at birth. Ideally, at every birth, there should be a person who can provide essential services to both mother and infant and who is skilled and equipped to help babies breathe (Helping Babies Breathe Global Implementation Taskforce, 2011). The new updated curriculum provides a way to transition to the next steps in care. It aims to reduce the newborn mortality rate from twenty-five to seven per 1,000 live births or fewer by 2035, which is a World Health Organization goal. In 2013, 2.8 million babies worldwide died within the first month of life and 2.6 million babies were stillborn ('Helping Babies Breathe 2 nd Edition Summary of Changes, 2015).

Globally each year, intrapartum-related complications (birth asphyxia) result in 1.2 million stillbirths (both pre-term and term newborn), whereby, 96% of these 1.2 million occur in low and middle-income countries. (Pejovic *et al.*, 2018). In addition, it is approximated that 10 million babies cannot establish their own spontaneous breathing during birth and need assistance. A major factor contributing to the high mortality is a global lack of trained providers in neonatal stabilization and/or resuscitation which is most acute in Sub-Saharan Africa with the highest neonatal mortality (Mzurikwao, Ng and Ernest, 2018). Successful initial resuscitation could prevent a large proportion of these deaths and improve the outcomes of neonates surviving asphyxia. Therefore, all birth attendants, including physicians, midwives and nurses ought to have the knowledge and skills required to perform immediate newborn resuscitation. Helping babies breathe is a key component in reducing neonatal mortality due to birth asphyxia. ('Helping Babies Breathe 2 nd Edition Summary of Changes', 2015).

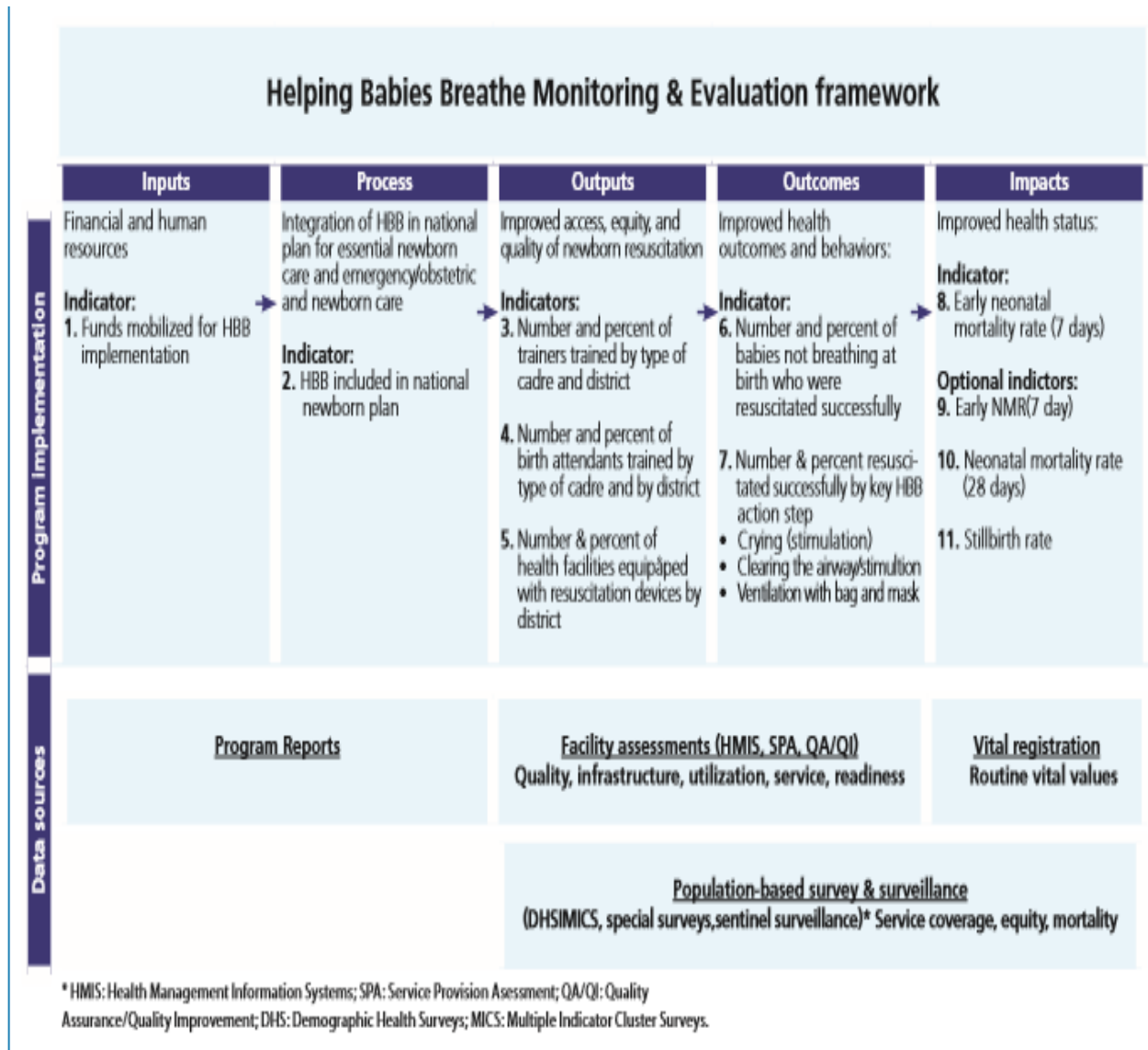
The three leading causes of neonatal mortality worldwide are prematurity (36%), birth asphyxia (23%), and infections (23%). Neonates who survive birth asphyxia may have such long-term consequences as cerebral palsy, epilepsy, and learning disabilities. Initial neonatal resuscitation has the potential to prevent perinatal mortality caused by intrapartum related asphyxia for almost two million babies annually. However, to be successful, skilled birth attendants (SBAs) must be trained to perform appropriate and adequate neonatal resuscitation in the critical first minutes after birth (Bang *et al.*, 2016). At current rates, it will be over 150 years before African newborns have the same chance of survival as a baby born today in Europe or North America. Hence, attention is increasingly focusing on reducing neonatal mortality in order to achieve sustainable progress toward future global goals (Bang *et al.*, 2016). To improve the outcomes of resuscitated newborns, we need birth attendants, especially midwives, who are competent and comfortable in resuscitation skills, including appropriate assessment of the newborn's condition immediately after delivery. Continued efforts are needed to improve simulation training using manikins that are more realistic as well as increased frequency of practice. It is important to introduce teamwork organization during resuscitation training in low-income countries (Moshiro *et al.*, 2018).

1.2 Statement of the problem

Evidence from around the world show that the risk of perinatal death increases by 16% for every 30 seconds up to six minutes delay in initiating ventilation and by 6% for every minute of delay of the applied bag and mask ventilation. Therefore, the first minute after birth is critical to reduce neonatal mortality (Ersdal, 2018). The evaluation of HBB implementation conducted throughout Tanzania at various levels of the health system immediately after training of birth attendants on neonatal resuscitation during golden minute showed that, the Objectives Structured Clinical Examination (OSCE) results for DSM region was 74.5%. The score performance was low compared to other regions whereby their score performance ranged between 84.3% and 92.6%. After 4 to 6-weeks of follow-up visits the performance declined in each region and DSM region scored 57.9% (Arlington *et al.*, 2017).

Tanzania is the first country to commence a national HBB implementation process in 2009 using the first HBB guideline, and thereafter, in 2013; it started a national rollout of HBB. Health Care providers (HCPs) who attended training were expected to return to their facilities and use training materials to train their colleagues who could not attend the course, although these colleagues would not be considered formally HBB trained. This training could help in promoting and sustaining the acquired knowledge and skills in immediate newborn resuscitation hence decreasing neonatal death due to birth asphyxia. HBB implementation resulted in a significant 47% reduction in early neonatal mortality from 13.4 to 7.1 per 1,000 live-born deliveries and a significant reduction 24% in fresh stillbirths from 19.0 per 1,000 re-implementation to 14.4 per 1,000 births post implementation (Perlman and Msemo, 2017). Despite the efforts made in earlier implementation of HBB by training SBAs in neonatal resuscitation, still neonatal death due to birth asphyxia is among the top three conditions causing neonatal death in both Tanzania mainland and in Zanzibar. In Zanzibar the causes are birth asphyxia 29.5%, prematurity 24.7% and sepsis 19.5% (Wilson *et al.*, 2017) and in Tanzania mainland, the main causes of neonatal deaths are birth asphyxia 29.3%, prematurity 24.7% and sepsis 19.7% (Jansheski, 2019). It seems there is inefficient adherence to the guideline in initial newborn resuscitation for Implementation of HBB initiative, therefore, this study assessed factors associated with the implementation of HBB guideline adherence in initial newborn resuscitation among skilled birth attendants in selected health facilities in Dar es Salaam region.

The original conceptual framework on HBB



Source: American Academy of Pediatrics (AAP, 2015)

1.2 Original conceptual framework

Description of original conceptual framework on Helping Babies Breathe monitoring and evaluation (AAP, 2015).

This conceptual framework on Helping Babies Breathe was designed by American Academy of Pediatrics (AAP) for Monitoring and Evaluation of HBB implementation (AAP, 2015). The HBB Program implementation describes the following; a). Policy and advocacy; addresses supportive policies; service standards and guidelines need to be in place to move from pilot programs to scale-up. Written national guidance on all elements in the strategic plan needs to be actively disseminated at all levels. b). Training- the situation analysis may result in a decision to amend current neonatal resuscitation practices through task sharing, the provision of resuscitation equipment and training at lower levels in the system etc. c). Clinical services- the plan should address any gaps affecting continuous availability of services identified during the situation analysis. These might include:

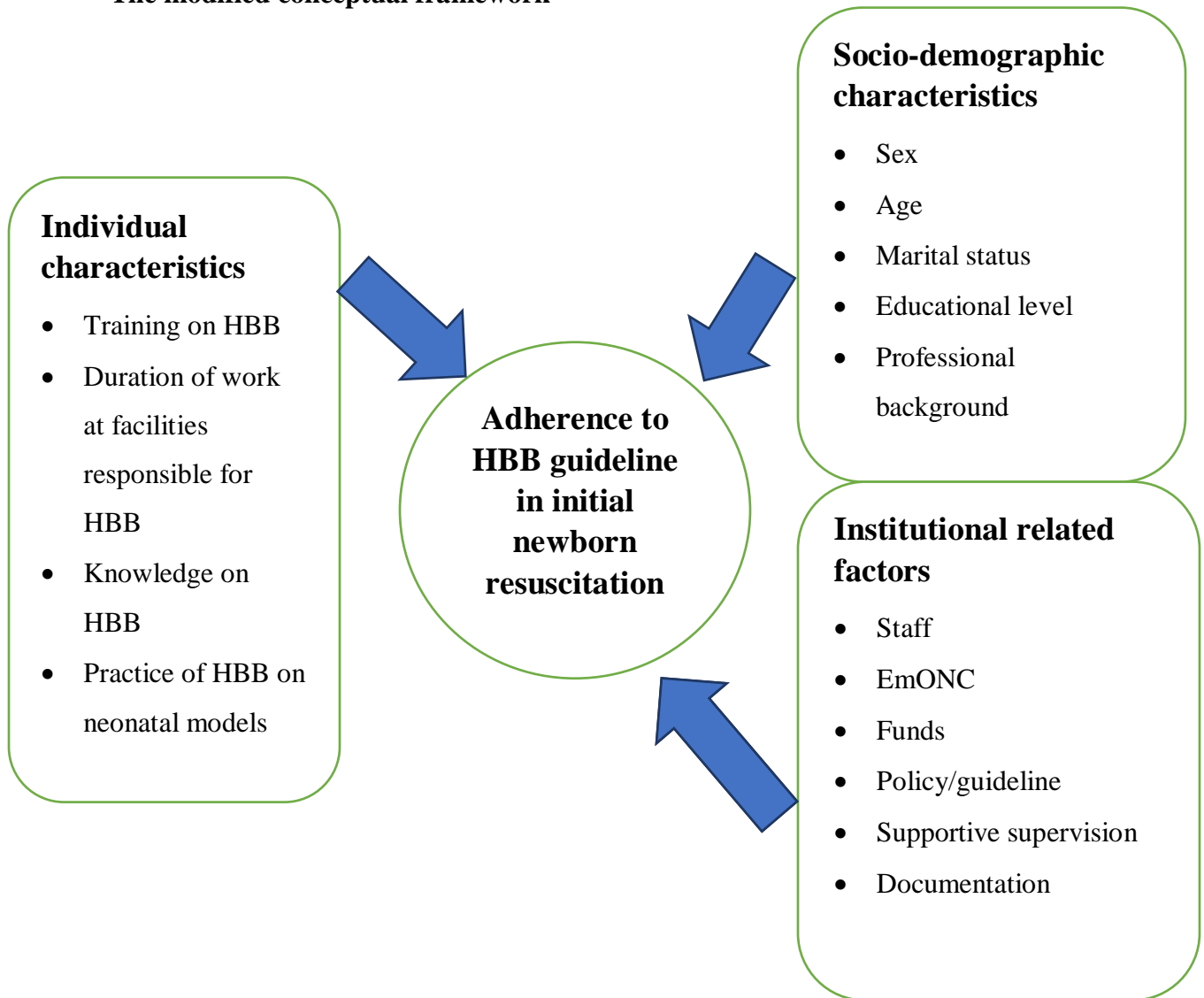
- Provision of resuscitation equipment to priority sites
- Plans to build and sustain an adequate workforce (including task sharing) to improve the coverage of skilled attendance at birth
- Strengthening of capacity in sites providing referral and specialty care.
- Establishment of procurement chain or clinical equipment/supplies.
- Process for inclusion of resuscitation equipment and services of trained birth attendants in national, regional, and district plans and budgets used as a guide to construct the study.

The modified conceptual framework illustrating the relationship between the study variables on factors associated with implementation of HBB guidelines among skilled birth attendants.

The researcher modified the original framework on the part of clinical services and assessed the factors associated to the Implementation of HBB guidelines adherence in initial newborn resuscitation. The framework was used to guide literature review, framing objectives and developing questionnaires. In addition, it guided discussion and presentation of study results. Regarding the objectives of this study, the proportion of birth attendant trained for HBB was determined. The association of individual factors on HBB, such as knowledge, training, practice and duration of work at facilities responsible for HBB was determined. In addition, the social

demographic characteristics like sex, age, and educational background, professional and educational level were assessed. The institutional factors assessed focused on availability of staff and neonatal resuscitation kit, HBB guideline integrated in hospital neonatal care plan (HBB integrated to EmONC), it also included supportive supervision, funds mobilized for HBB implementation and documentation on neonatal resuscitation outcome.

The modified conceptual framework



Source: Adapted from American Academy of Pediatric 2015 and modified by researcher (APA, 2015)

1.3 Rationale of the study

The findings obtained from this provide information to the on the Ministry of Health Community Development, Gender, Elderly and Children (MoHCDGEC) about the implementation of HBB Initiative: Adherence to the guideline in initial newborn resuscitation and evidence for further expansion and application to other hospitals in Tanzania. In addition, midwives, obstetrician and pediatrician can use the results from this study; to learn and improve their competences in adhering to guideline in initial newborn resuscitation thus contribute to the decrease of neonatal death due to birth asphyxia. Furthermore, the findings will facilitate the improvement of the policy on training and clinical services together with providing chance for further researches.

1.4 Main research question.

1. What are the factors associated with the implementation of HBB guideline adherence in initial newborn resuscitation among skilled birth attendants working in maternity units in health facilities in Dar-es-Salaam region.

1.5 Research questions

1. What is the proportion of HBB trained skilled birth attendants (SBAs) working in maternity units in Dar-es-Salaam region?
2. What are the individual factors associated with the implementation of HBB guideline adherence to initial newborn resuscitation among skilled birth attendants working in maternity units in Dar-es-Salaam region.
3. What are the institutional factors associated with the implementation of HBB guideline adherence initial newborn resuscitation among skilled birth attendants working in maternity units in Dar-es-Salaam region.

1.6 Broad objective

To assess the factors associated with the implementation of HBB guideline adherence in initial newborn resuscitation among SBAs working in maternity units in health facilities in Dar-es-Salaam region.

1.7 Specific objectives

1. To determine the proportion of HBB trained skilled birth attendants (SBAs) working in maternity units in Dar-es-Salaam region.
2. To determine the individual factors associated with the implementation of HBB guideline adherence in initial newborn resuscitation among skilled birth attendants working in maternity units in Dar-es-Salaam region.
3. To assess the institutional factors associated with the implementation of HBB guideline adherence in initial newborn resuscitation among skilled birth attendants working in maternity units in Dar-es-Salaam region.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Socio-demographic characteristics of the study participants.

Professional / Educational background

Study done in Afghanistan reported that midwives proved to be as capable as doctors in performing newborn resuscitation which indicate the major investment made in midwifery education, therefore Midwives received training more than doctors as part of pre-service education by 59% and 35%, respectively. Competency-based pre-service and in-service training and supportive supervision is an effective way to build providers capacity to perform newborn resuscitation. Furthermore the results showed that there is no significant differences found between doctors and midwives on knowledge, clinical skills, or confidence in performing newborn resuscitation whereby, 75% of doctors and 83% of midwives felt very confident in their ability to perform newborn resuscitation (Kim, Ansari, Kols, Tappis, Currie, Zainullah, Bailey, Semba, Sun, van Roosmalen, *et al.*, 2013).

Another results from pre and post training done in NICHD Global Network research sites showed that, both physicians and nurses had significant difference in pre-training knowledge and ventilation tests in pre-test. The difference disappeared after HBB post training when more than 98% of them passed the knowledge tests and the proportion of both of them who correctly ventilated a neonatal model increased from approximately 4% to 97% (Bang *et al.*, 2016). This implies that, both midwives and doctors are capable adhering the guideline in initial newborn resuscitation despite of differences in educational and professional background.

2.2. Individual factors associated with the implementation of HBB guideline adherence in initial newborn resuscitation.

Training of skilled birth attendants on HBB

HBB was developed in 2005–2009, by the American Academy of Pediatrics (AAP) with partners as a response to the Millennium Development Goal (MDG) 4 which was to reduce under-5-year child mortality by two-thirds between 1990 and 2015 (Ersdal, 2018). A cohort study done in Nepal on reducing perinatal mortality reported that the first minute after birth of an infant is the crucial window for neonatal resuscitation for 10 million non-breathing infants born annually

(KC *et al.*, 2016). In Zanzibar the main causes of neonatal death is birth asphyxia 29.5%, prematurity 24,7% and sepsis 19.5% (Wilson *et al.*, 2017).

HBB is a key component in reducing neonatal mortality due to birth asphyxia (Mzurikwao, Ng and Ernest, 2018). American Academic of Pediatric reported that more than 400,000 providers in 77 countries has been trained in HBB and the curriculum was updated whereby the new guideline provides steps toward reducing the newborn mortality rate from twenty-five to seven per 1,000 live births or less by 2035 a world health goal (Korioth and Writer, 2016). Globally the current deficit of doctors, nurses and midwives is about 7.2 million and by 2035, the global deficit of skilled professionals will grow to about 12.9 million. In Africa, there are only two trained health workers on HBB for every 1,000 people and in South East Asia there are four. From this study, it indicates that there is great shortage of trained SBAs in developing countries that implementation of HBB intended. The neonatal death will reduce if all the SBAs trained and adhere to HBB guideline in initial neonatal resuscitation especially in golden minute (Kim, Ansari, Kols, Tappis, Currie, Zainullah, Bailey, Semba, Sun, Roosmalen, *et al.*, 2013).

An introduction to training on HBB; “The golden minute” in South Africa report showed that almost one million stillbirth and 830 000 neonatal deaths were due to asphyxia. The target of this training was to reduce death by initiating resuscitation immediately after newborn birth (C, 2012), resuscitation training in facilities can reduce intrapartum related neonatal death by 30% (Kc *et al.*, 2016). Another study in Afghanistan on assessment of capacity for newborn resuscitation and factors associated with providers knowledge and skills showed more than 80% of providers had been trained on newborn resuscitation (Kim, Ansari, Kols, Tappis, Currie, Zainullah, Bailey, Semba, Sun, van Roosmalen, *et al.*, 2013). This implies that large proportion of SBAs attended training and most babies born with birth asphyxia could get immediate care. In 2017 an evaluation on implementation of Helping Babies Breathe done in Tanzania. A 3-Year experience results showed that at 4 to 6-weeks follow-up visits the evaluation team found the proportion of birth attendants who received formal HBB training varied by region from 50.8% to 88.0%. During 4 to 6 month follow-up visits, there was a decline in percentage of formally HBB-trained birth attendants that varied between 40.4%–71.3%). Percentage of Birth Attendants who have completed formal HBB training in DSM 4–6 week after training was 53.7% and 4–6 Months after training was 56.5%. The proportion was low compared to number of population

saved. In addition, common challenges reported were insufficient duration of the training for one day and of mastering skills in bag-and-mask ventilation as revealed by lack of skills and confidence in using the bag-mask since adequate ventilation is fundamental in saving non-breathing babies. AAP second version updated the standard HBB course by 2-days for training to allow for more hands-on learning and practical training using the newborn simulator (Arlington *et al.*, 2017). Addition of training duration help SBAs more equipped with skills and ease mastering resuscitation skills. Incorrect practices in newborn resuscitation was also reported by the qualitative study conducted at Haydom Lutheran Hospital (Moshiro *et al.*, 2018).

Knowledge and practice on HBB of SBAs

In South Sudan training interventions among health workers; quasi non-experimental study shown that the HBB knowledge improved by 55.3% from 42.5% at pre-training to 97.8% immediately after post training. This result concurred with a similar training intervention done in Kenya that showed increased passing rate of the knowledge test from 75% to 95%. The use of the simulated-based environment for teaching and learning had greatly improved the health workers HBB knowledge and skill in neonatal resuscitation; however, the knowledge was not retained after three months (Draiko *et al.*, 2018). Global Network research sites (Nagpur and Belgaum, India and Eldoret, Kenya) reported the knowledge-skills gap that was evident before the initial HBB training recurred months later at refresher training despite ongoing mentoring and supportive supervision (Bang *et al.*, 2016). Health facilities are ought to conduct refresher training regularly and find other measures suitable for maintaining the acquired knowledge and skills that are the important components in sustaining neonatal resuscitation.

The training implemented in Sudan contributed to the improvement of the knowledge of the health workers from intervention Hospital however, the level of knowledge attained at post-training declined at the end of implementation period. Meanwhile there was no significant increase in knowledge among the health worker in the control site. Many researchers who conducted a similar study suggested refresher-training courses between the post training and implementation period in order to advocate the retention of knowledge, skill and competencies among the trainees (Draiko *et al.*, 2018).

Duration of work at facilities responsible for HBB (working experience)

The result of a cross sectional study in Afghanistan reported no significant difference in experience among doctors and midwives as the average years they had offered EmONC services was likely the same between 6.5 and 5.9 years (Kim, Ansari, Kols, Tappis, Currie, Zainullah, Bailey, Semba, Sun, Roosmalen, *et al.*, 2013). According to clinical practice those SBAs stayed in the maternity unit for a long time gain more experience and are more likely to adherence to the neonatal resuscitation steps.

2.3 Institutional factors associated with the implementation of HBB guideline adherence in initial newborn resuscitation.

Availability of trained SBAs

HBB was initiated with an overall vision to train large numbers of birth attendants worldwide using a cascade model to ensure that all babies are born with a skilled birth attendant present (Ersdal, 2018). Ideally, at every birth, there should be a person who can provide essential services to both mother and infant and who is skilled and equipped to help babies breathe ('Helping Babies Breathe 2 nd Edition Summary of Changes', 2015).

Availability of equipment during resuscitation of newborn

The study results reported in Kenya revealed adequate equipment in neonatal resuscitation (Shikuku *et al.*, 2018). This is also supported by the study results reported in Afghanistan whereby, lack of equipment and training do not pose major barriers to newborn resuscitation because over 90% of facilities had essential equipment for newborn resuscitation, including a mucus extractor, bag, and mask (Kim, Ansari, Kols, Tappis, Currie, Zainullah, Bailey, Semba, Sun, van Roosmalen, *et al.*, 2013).

Availability of the guideline and supervision

Practice and outcomes of neonatal resuscitation for newborns with birth asphyxia at Kakamega General Hospital, Kenya: a direct observation study reported availability of the guideline, job aids, equipment and training done to Health Care Providers (HCPs) but practices of HCPs with regard to neonatal resuscitation are still been reported poor. Successful neonatal resuscitation by trained HCPs has the potential to prevent perinatal mortality caused by intrapartum related asphyxia for almost two million babies annually. Ineffective or wrong resuscitation practices are

linked to the persistently high neonatal deaths from birth asphyxia in the first 1–24 hour (Shikuku *et al.*, 2018). Cost analysis of large-scale implementation of the ‘Helping Babies Breathe’ newborn resuscitation-training program in Tanzania reported that for skills retention supportive supervision and regular mentoring were considered critically important (Chaudhury *et al.*, 2016). Several challenges reported in training done in Zanzibar on HBB implementation. These challenges are related to the current health system/infrastructure for example no space for newborn resuscitation, shortage of staff and little time for on the job training, frequent rotation and turnover of HBB trained staff, inappropriate staff participation in HBB training and an inadequate system for the supply and replacement of equipment (Wilson *et al.*, 2017).

Recording of the newborn resuscitation outcome (Documentation)

The observational study done in Karolinska on Neonatal resuscitation documentation showed that there was no documentation on resuscitation and in 126 infants (40%), documentation was incomplete and this study suggested improvement of the overall documentation of neonatal resuscitation to enable accurate and reliable evaluation. (Berglund and Norman, 2012).

Neonatal resuscitation documentation is not standardized and has significant variation. Variation in documentation was mostly dependent on institutional factors, not infant or provider characteristics. Understanding this variation may lead to efforts to standardize documentation of neonatal resuscitation (Braga *et al.*, 2015). It is important for the health facilities to standardize the system of documentation as recommended in the guideline for statistical references and improvement of neonatal resuscitation services.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Study design

The study design was descriptive cross sectional. A cross-sectional study provides information about a health condition / disease that exists at a given time during a given period and involves the entire population or sample population. From a well-defined population, disease status and exposure are assessed simultaneously (CDC, 2012).

3.2 Study setting/ Area

This study was conducted in Dar- es- salaam region, the major commercial, administrative and industrial centre in Tanzania. It is located between latitudes 6.36° and 7.0° to the south of equator and longitudes 39.0° and 33.33° to the East of Greenwich. It is bounded by Indian Ocean on the East and Coast Region on the West border. The total surface area of Dar es Salaam city is 1,800 km², comprising of 1,393 km² of land mass with eight offshore islands, which is about 0.19% of the entire Tanzania Mainland's area. It is a region with high population in Tanzania; the population was 4,364,541 according to official 2012 census. The region has five districts: Kinondoni in the north, Ilala in the centre, Ubungo and Temeke in the south and Kigamboni in the east across the Kurasini creek. There are about 8 government hospitals providing maternity services and 16 non-government hospitals according to NBS, 2017. The region was selected as the study area because the performance was low in Objective Structured Clinical Examination (OSCE) after the evaluation done on HBB implementation in 16 regions of Tanzania mainland. The five selected hospitals provide the same level of maternity services whereby all the selected facilities provide labour, delivery, antenatal and postnatal services. In each health facility, there are different levels of skilled birth attendants from certificate to master's level and all the facilities provides HBB services to a newborn with birth asphyxia.

3.3 Study population

Study population is the population from which the sample is selected (Polit & Beck, 2013).

The study population included all skilled birth attendants specifically midwives and nurses holding certificate, diploma, undergraduate or master's degree who are working in maternity units in selected government and private hospitals.

3.4 Inclusion criteria

The inclusion criteria were full time employed skilled birth attendants specifically registered nurses, midwives and enrolled nurses who most of the time assist women during deliveries. Those on duty in maternity unit were included during the time of data collection after they agreed and signed the informed consent.

3.5 Exclusion criteria

The exclusion criteria were sick registered nurses, midwives and enrolled nurses and those who were working as part time for a short period during data collection. These part time skilled birth attendants were those only called to work when need arise in order to cover the shortage at a particular time.

3.6 Sampling

3.6.1 Sample size

The sample size was estimated with the help of Yamane (1967) formula because a given sample size provides proportionately more information for small population than for large population. Yamane formula provides a simplified formula to calculate sample sizes Yamane (1967:886)

The formula is given by

$$n = \frac{N}{1+N(e)^2}$$

Where n is the required minimum sample size,

N is the population size, (total number of birth attendants (BAs) in all hospitals)

e is the level of precision = 5% (the precision level given a 95% power of the study)

95% confidence level.

Note: The total number birth attendants (BAs) in all six hospitals is 172 as a sum obtained officially through appropriate procedures from the in-charge of each health facility and head of the department. Therefore;

$$n = \frac{172}{1+172(0.05)^2}$$

$$=120$$

A 10% added for the non-responses, thus

$$n = \frac{120 * 100\%}{100\% - 10\%} = \frac{12000}{90}$$

$$n = 133$$

The minimum sample size of was 133 birth attendants (BAs).

3.6.2 Sampling Techniques/ Method

Sampling is the process of selecting a portion of the population to represent the entire population and a sample is a subset of population element (Polit & Beck, 2013). Simple random sampling method by lottery method was used to select the three districts and six hospitals. The three districts were Temeke, Kinondoni and Ilala and six hospitals selected were; three from government and three from non-government hospitals that are Mwananyamala, Amana, Temeke, Kairuki, Rabininsia and TMJ hospital. The number of potential study participants available in each maternity unit (Labour and antenatal wards and postnatal wards) in selected hospitals were; Mwananyamala 38, Amana 40, Temeke 44, TMJ 19, Kairuki 15 and Rabininsia 16 which make the total population of 172. Probability proportional sampling was used to select participants from five selected health facilities, which were 133 skilled birth attendants and in each health facility convenience sampling was used to obtain the participants and then estimated sample was computed using formulae $n_i = \frac{p_i}{N} * n$ in each health facility. Where N is a total number of birth attendants in five health facilities, p_i and n_i indicates number of birth attendants present in each specified health facility and estimated sample size from each facility, $i=1,2,3,4,5,6$.

The following calculation was used.

Facility Name	# birth attendants (p_i)	Estimated sample ($n_i = p_i / N * n$)
Mwananyamala	38	29
Amana	40	31
Temeke	44	34
TMJ	19	15
Kairuki	15	12
Rabininsia	16	12
Total (N)	172	n = 133

3.7 Variables

3.7.1 Dependent variables

The dependent variable was guideline adherence in initial newborn resuscitation. The assessment done by using a structured scenario on perceived level of performance whereby steps were disorganized and the respondents asked to arrange the disorganized steps in sequence on how to perform initial resuscitation to the newborn with birth asphyxia following action plan according to HBB guideline. Those who scored from six steps and above (75% and above) out of eight were considered adhering the initial steps and those scored below six were considered not adhering.

3.7.2 Independent variables

Social demographic characteristics such as; Sex, age, marital status, educational background, and professional educational level.

Individual characteristics such as knowledge on HBB, training on HBB, duration of work at facilities responsible for HBB and practice of HBB.

Organizational/institutional factors such as staff (skilled birth attendants), guideline, institution offer EmONC), supportive supervision, documentation of resuscitation outcome and Funds mobilized for HBB.

3.8 Data collection.

3.8.1 Data collection tools:

A structured questionnaire was used to collect data. The questionnaire comprised of four parts. Part I comprised of eight questions for socio-demographic data. Part II - Three questions on proportion of trained Birth Attendants. Part III comprised of twenty-six questions regarding the individual factors linked to the implementation of HBB guideline in adherence to the initial newborn resuscitation. Among twenty-six questions, thirteen questions assessed the level of knowledge whereby each question has four options of which one option is the most correct answer, to qualify adequate knowledge for newborn resuscitation SBAs must score 80%. Part IV had five questions on institutional factors. The correctly answered option awarded a score of one and incorrect answer scored zero marks. Guideline adherence in initial newborn resuscitation was assessed using structured scenario for perceived level of performance whereby the scenario structured in the manner that it contained all the features of a delivered baby with birth asphyxia and the SBA was asked to resuscitate the asphyxiated newborn within first minute at birth (golden minute). At this part, eight steps of the resuscitation procedure disorganized in arrangement on clearing the airway and ventilation by mask and ambu-barg and the participant asked to rearrange in sequence. To qualify psychomotor skill and competency according to HBB guideline, the accepted level of performance in adherence to initial steps in newborn resuscitation is above 75%. It means the SBA has to score least six steps and above out eight in order to be considered sufficient in managing baby with birth asphyxia during golden minute and to adhere the initial newborn resuscitation.

3.8.2 Data collection method:

Structured questionnaire was used to collect data

In each health facility, the researchers collected data for three to five days in health facilities with small number of participants and five to seven days in health facilities with large number of participants. Health facilities informed prior to researcher's visits and upon arrival at the health facility the researcher obtained consent from the facility in charge, introduction for the visit was done to the hospital management and unit in-charges and staff in maternity, and each participant was given a self-administered structured questionnaire to fill. The Research Assistants handled the questionnaires and the main researcher kept the data collected.

3.9 Validity of tool.

Is the extent to which any measuring instrument measures what is intended to measure or, is the degree to which an instrument measures what it is supposed to measure also concerns a measure's accuracy (Polit & Beck, 2013). To ensure validity of the data, the questionnaire was adopted from a HBB provider's guide, trainer's guide and helping babies breathe guideline second edition, developed by American Academy of Pediatrics, 2015. HBB guideline is the standard guide used worldwide especially in resource limited settings.

3.10 Reliability of the tool

Refers to the consistency, stability and repeatability of results (Twycross and Shields, 2004). It refers to the degree to which an instrument measures the same way each time used under the same condition with the same subjects. An instrument is reliable to the extent that its measures reflect true score (Polit & Beck, 2013). To ensure reliability, pre-testing of questionnaires was done at Sinza hospital before the actual study whereby, information collected was not used in the analysis of actual data, instead were used to amend the questionnaires. It also helped to identify the time taken to fill the questionnaires and errors that were then corrected to ensure that the instructions were clear.

3.11 Training of Research Assistants

Three Research assistants who had experience in providing HBB service trained to assist in data collection with the help of principal investigator. The training based on understanding study objectives, sampling procedure and ensuring completeness of the questionnaires. The questionnaire was crosschecked for completeness and consistency of the responses before releasing to the interviewee to avoid errors and to yield efficient results during data collection. Data collection team had meetings daily to review the daily activities and shared experience.

3.12 Data analysis

The data were coded and entered into SPSS Version 25.0 statistical software for analysis. Further, data cleaning (editing by arranging in categorical data, re-coding, checking for missing values, and outliers) was done with help of SPSS.

	Objective	Analysis
1	To determine the proportion of HBB trained birth attendants (BAs) working in maternity units in Dar-es-Salaam region.	Proportions with 95% confidence interval, frequency and percentages.

2	To determine the individual factors associated with implementation of HBB guideline among birth attendants working in maternity units in Dar-es-Salaam region.	Cross tabulation / Chi square test, logistic regression (crude and adjusted odds ratios)
3	To assess the institutional factors associated with implementation of HBB guideline among birth attendants working in maternity units in Dar-es-Salaam region.	Cross tabulation / Chi square test, logistic regression (crude and adjusted odds ratios)

3.12.1 Descriptive data analysis

Social demographic characteristics and the proportion of HBB trained skilled birth attendants (SBAs) working in maternity units was analyzed using descriptive data analysis whereby frequency and percentages were determined. The social demographic characteristics variables were age, sex, marital status, working area, educational level, and professional background.

3.12.2 Inferential statistics

Cross tabulation / Chi square test was applied first then then logistic regression (crude and adjusted odds ratios) analysis was done to test for the statistical significant variable in specific objectives for individual and institutional factors. The variables included in individual factors were knowledge, training on HBB, working experience, practice and use of or practice on mannequin/ neonatal model. Variables for institutional factors were staff, policy/guideline, supportive supervision, documentation, offering EmONC services, and Funds mobilized for HBB.

Variables inclusion and selection during analysis

Initially just one explanatory variable at a time (Bivariate models) was carried out where variables were dropped one by one, preferably dropping the less significant one and afterwards included in the multivariate model all variables that showed a relaxed P-value ($P \leq 0.25$). This relaxed P-value criterion would allow reducing the initial number of variables in the model reducing the risk of missing important variables. This inclusion was found reliable since if too many variables are included at once in a full model, significant variables could be dropped due to low statistical power, which may be an impact of the interaction with other variables in the

model. Thus, a 95% confidence interval was computed to show factors that were statistically significant. The findings were presented using tables.

Model Specification

$$\text{logit}(\pi) = Y = \log(\pi/1-\pi)$$

$$Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k$$

Where

Y is a binary response variable that is the implementation of HBB guideline adherence to initial newborn resuscitation among birth attendants.

$Y_i = 1$ if the SBAs adhere to the guideline in initial newborn resuscitation.

$Y_i = 0$ if the SBA adhere to the guideline in initial newborn resuscitation.

$X_1 X_2 \dots X_k$ is a set of explanatory variables that for this case, they are the covariates for each specific objective that can be discrete, continuous, or a combination.

π indicates the probability a birth attendant to implement HBB guideline

β_i are the regression coefficients associated with the reference group.

Odds ratio.

Odds are the ratio between probabilities: the probability of an event favorable to an outcome and the probability of an event against the same outcome. Probability is constrained between zero and one and odds are constrained between zero and infinity, thus odds ratio is the ratio between odds.

$$\exp(\beta_0 + \beta_1(x_i + 1)) = \exp(\beta_1)$$

$$\exp(\beta_0 + \beta_1 x_1).$$

Where, $\exp(\beta_0)$ = the odds that the birth attendant implements HBB in an observation i when

$X_i = 0$, i.e., at baseline.

$\exp(\beta_1)$ = for every unit increase in X_i , the odds that the birth attendant implements HBB is multiplied by $\exp(\beta_1)$. This is similar to simple linear regression but instead of additive change, it is a multiplicative change in rate. This is an estimated odds ratio.

3.13 Ethical clearance

Ethical clearance to carry out this research obtained from the Research and publication committee of Muhimbili University of Health and Allied Sciences (MUHAS) Ref. No. HD/MUH/T.379/2018/02. IRB #: MUHAS-REC06-2020-299. Permission to conduct a research for private hospitals (Kairuki and TMJ) Ref: No: KMC/HEALTH were granted by Executives Municipal Directors of Kinondoni and Ubungo Municipal councils whereby for government hospitals (Temeke, Amana and Mwananyamala) permission was given by Executive Directors of the respective hospitals. Amana Ref: No: MOH CDGEC/ARRH/R.1/X1/41 and Temeke Ref: No: TRRH IRS.C/9/3/80. Written informed consent obtained from the healthcare providers working in maternity unit in selected health facilities prior to data collection.

The principal Researcher kept all collected data confidential and no identifiers used. Informants had the right to withdrawal from participating without interfering with their routine activities. No risks and no any inconvenience occurred that could be handled by the interviewer.

3.14 Dissemination of the study results

The result for this study will be disseminated to;

1. Muhimbili University of Health and Allied Sciences library for further reference.
2. Executive medical officers: Kinondoni Municipal Council
3. Executive Medical Directors: Temeke, Kinondoni and Ilala hospitals
4. Executive Directors: Kairuki and TMJ hospitals
5. Publication to nursing journals and presentations at National and International scientific conferences.

CHAPTER FOUR

4.0 RESULTS

4.1 Introduction

This section represents the results per the study objectives. These are: proportion of HBB trained birth attendants (BAs), individual factors associated with the implementation of HBB guideline adherence in initial newborn resuscitation and institutional factors associated with the implementation of HBB guideline adherence in initial newborn resuscitation among birth attendants working in maternity units in Dar-es-Salaam region. Of the 133 participants involved in the study, 132 responded to the questionnaires. The respondents were taken as 100% during data analysis. The analysis was based on the specific study objectives as stipulated below:-

4.2 Presentation of data in Social demographic characteristics of the participants

The majority of respondents 40.9% had the age between 26 to 35 years and most of them were married 67.4%. Most of the respondents were female 84.8% and had completed the certificate level 40.9%. Professional background was registered nurses 37.1%, Enrolled nurse 42.4% and Registered midwives 20.5%. Most 42.4% of respondents were working in the labor ward.

Table 1: Socio-demographic characteristics of the participants

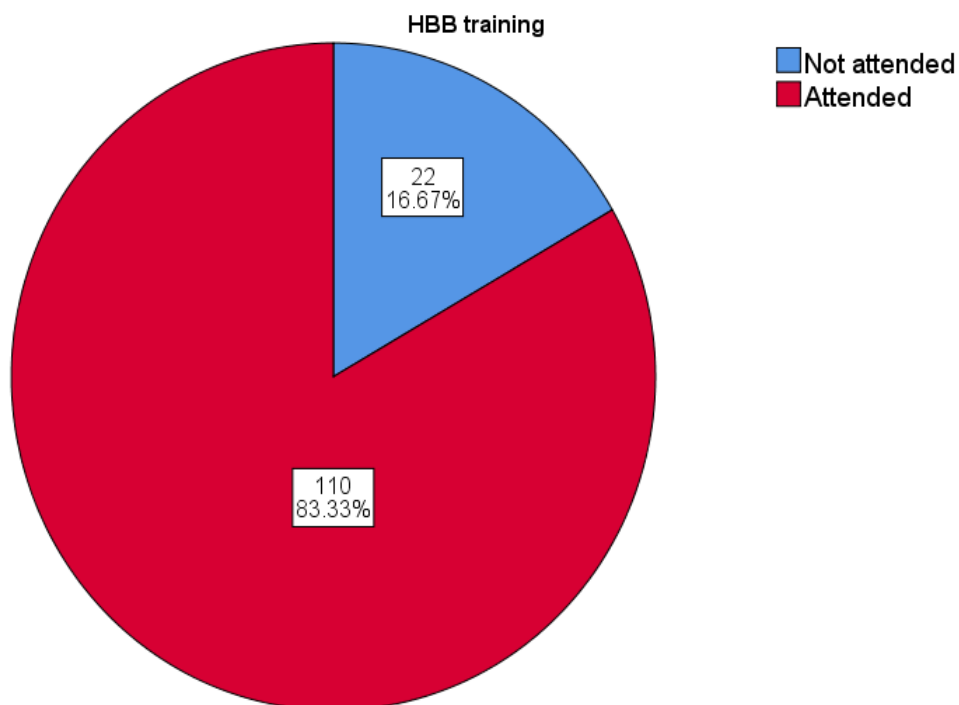
Variables	Frequency	Percentage (%)
Age (years) of respondents		
Below 25	7	5.3
26 to 35	54	40.91
36 to 45	48	36.36
46 and above	23	17.42
Sex of respondent		
Male	20	15.15
Female	112	84.85
Marital status		
Married	89	67.42
Single	43	32.56
Education level		
Certificate	54	40.91

Diploma	52	39.39
Degree	26	19.7
Professional background		
Registered Midwives	27	20.45
Enrolled nurses	56	42.42
Registered nurses	49	37.12
Working area		
Labour ward	56	42.42
Antenatal ward	46	34.85
Postnatal ward	30	22.72

4.3 Proportion of trained Birth Attendants on Helping Babies Breathe

Out of 132 respondents, 110 (83.3%) were trained while 22 (16.7%) did not receive any training on HBB as shown in figure 1.

Figure 1: Proportion of the Birth Attendants trained on the HBB.



4.4 Association between individual factors and adherence to HBB guideline in initial newborn resuscitation.

The assessment of adherence to the HBB guideline in initial newborn resuscitation was done by using a structured scenario on perceived level of performance by asking the respondents to rearrange in sequence the disorganized steps on how to follow initial steps during the resuscitation of the newborn with birth asphyxia according to guideline action plan. SBA who managed to score six steps and above out of eight were considered adhering and those scored below six steps were considered not adhering. Therefore, those who adhere were 45 (34.1%) and those who do not adhere for one reason or other were 87 (65.9%). Table 2 shows the association between individual factors and adherence to HBB guideline in initial newborn resuscitation using the chi-square test. Training status (P value = 0.034), showed significant association with adherence to HBB guideline in initial newborn resuscitation. However, with a multivariate analysis (table 3) of individual factors in relation to adherence to initial newborn resuscitation using logistic regression, HBB training remained significant (P value = 0.045, AOR = 2.24).

Table 2: Association between individual factors and adherence to the HBB guideline in initial newborn resuscitation.

Variables	Adherence to HBB guideline in initial newborn resuscitation			P-Value
	No (%)	Yes (%)	Total	
HBB Training				
No	11(50.00)	11(50.00)	22	0.034
Yes	76(69.09)	34(30.91)	110	
Working experience in maternity unit				
Less than 1 years	14(63.64)	8(36.36)	22	0.805
One year and above	73(66.36)	37(33.64)	110	
Knowledge status				
Below 80%	81(64.80)	44(35.00)	125	0.256
80% and above	6(85.71)	1(14.29)	7	
Practice on mannequin/neonatal model				
Yes	35(72.92)	13(27.08)	48	0.199
No	52(61.90)	32 (38.10)	84	

Chi-square test

Table 2: Association between individual factors and adherence to HBB guideline in initial in newborn resuscitation

	AOR	95% C. I	P-Value
HBB Training (0: No, 1: Yes)	2.24	0.20 – 18.69	0.045
Working experience (0:< 1 year, 1;≥ 1year)	0.49	0.07 - 3.04	0.445
Knowledge (0:<80%, 1: 80% and above)	0.30	0.01 - 4.90	0.403
Practice on neonatal model (0: No, 1: Yes)	0.65	0.19 - 2.15	0.484
Logistic regression			

4.5 Association between institutional factors and adherence to HBB guideline in initial newborn resuscitation

Table 4 shows a chi-square test of institutional factors in relation to adherence to HBB guideline. Offering EmONC (P value = 0.013) and documentation of resuscitation outcome (P value = 0.039) become significant by chi square test. However when a multivariate analysis was performed using logistic regression, both documentation of HBB resuscitation outcome (P value = 0.025) and Offer EmONC (P value = 0.028) became significant as shown in table 5.

Table 3: Association between institutional factors and adherence to the HBB guideline in initial newborn resuscitation.

	Adherence to the HBB guideline in initial newborn Resuscitation			P-Value
	No (%)	Yes (%)	Total	
Number of supervisions				
One or less	57(61.96)	35(38.04)	92	0.146
More than one	30(75.00)	10(25.00)	40	
Offer EmONC				
Yes	77(70.64)	32(29.36)	109	0.013
No	10(43.48)	13(56.52)	23	
Documentation of resuscitation outcome				
Partograph	79(69.30)	35(30.70)	114	0.039
Others	8(44.44)	10(55.56)	18	
Client birth attendant ratio				
Less than or equal 6	8(50.00)	8(50.50)	16	0.152
More than 6	79(68.10)	37(31.90)	116	
Availability of Funds				
Yes	70(68.63)	32(31.37)	102	0.224
No	17(56.67)	13(43.33)	30	
Chi-square test				

Table 4: Association between institutional factors and adherence to the HBB guideline in initial newborn resuscitation.

	AOR	95% C. I	P-Value
Number of supervisions (0: Once or None, 1: > once)	0.54	0.24 – 1.25	0.149
Offer EmONC (0:No, 1:Yes)	3.35	1.14 - 9.81	0.028
Documentation of resuscitation outcome (0:Others, 1: Partograph)	0.21	0.05 – 0.82	0.025
Client birth attendant ratio (0:≤6, 1: >6)	0.11	0.01 - 0.98	0.058
Availability of Funds (0:No, 1:Yes)	0.25	0.04 - 1.64	0.15
Logistic regression			

CHAPTER FIVE

5.0 DISCUSSION

Reduction in neonatal mortality has been a great concern in Tanzania. It can be achieved by effective implementation of HBB protocol whereby skilled birth attendants needs to adherence to the guideline for newborn resuscitation. This study assessed the factors associated with implementation of HBB guideline adherence in initial newborn resuscitation and the three dimensions assessed were proportion of SBAs trained, the individual and the institutional factors associated with the implementation of HBB guideline adherence in initial newborn resuscitation.

The results of this study showed most respondents did not adherence to the practice of the initial newborn resuscitation as most of them scored below 80% of the steps set in the scenario and this has clinical implications. Decline in practice of HBB in initial newborn resuscitation was reported also by other studies (Arlington *et al.*, 2017). Proper practice of mask ventilation by a HBB trained SBA reduces the risk of neonatal death due to birth asphyxia during resuscitation in golden minute. All Birth Attendants need to master skills in ventilation of the newborn and this can be achieved through regular practice using simulation models/mannequins. Frequent practice on neonatal mannequin/model was supported by the study done in Malawi whereby, most of the health workers who participated in a clinical simulation of bag and mask ventilation using the NeoNatalie anatomic model had improved skills. The mean number of steps that were correctly completed (out of a total possible score of 10) was higher in round two (mean of 7.1) compared to round one (mean of 6.2) (Gupta *et al.*, 2014).

Results from this study showed that, most of the SBAs attended HBB training and there is significant association between training and adherence to the HBB guideline in practicing initial steps of newborn resuscitation by using logistic regression. The Skilled Birth Attendants who attended HBB training are more likely to adhere than those not attended training because they have acquired updated information on initial steps of newborn resuscitation. The same result was reported also by other study whereby, more than 80% of providers had been trained on newborn resuscitation (Kim, Ansari, Kols, Tappis, Currie, Zainullah, Bailey, Semba, Sun, Roosmalen, *et al.*, 2013). However, according to study results BAs who did not receive any training has clinical implication whereby, newborns attended by SBAs not trained could miss the most important immediate care in golden minute if need arise. HBB guideline standard demands at every birth,

there should be a skilled and equipped person who can provide immediate services to newborn during golden minute. (Helping Babies Breath Global Implementation Taskforce, 2011). Training of all the SBA could be possible by strengthening on job training and if the contents on implementation of HBB guideline especially initial steps in newborn resuscitation and use of action plan could be included in the curriculum of health training institutions from lower to higher levels including private institutions.

Documentation of HBB neonatal resuscitation outcome had shown significant association with adherence to the HBB guidelines in initial newborn resuscitation by using logistic regression. Most of the BAs reported the documentation of neonatal resuscitation outcome was done on the partograph; this implies health facilities use the same document. In contrast with this study Braga and colleagues reported unsatisfactory documentation whereby there was variation in neonatal resuscitation documentation (Braga *et al.*, 2015). According to our working environment, it is important to use the same document as variation of documentations may lose some important information for further references. Although the partograph is a common document in the health facilities but HBB, guideline demands the use of Health Information Management System (HIMS) as the standard document; therefore, it is important to use HIMS in documenting the outcome of resuscitation for statistics and for improving the working environment. This study results showed working experience in years in maternity unit had no significant association with the implementation of the HBB guideline and the similar results was also reported by a cross sectional study done in Afghanistan whereby, it reported no significant difference in experience among SBA (Kim, Ansari, Kols, Tappis, Currie, Zainullah, Bailey, Semba, Sun, Roosmalen, *et al.*, 2013). According to clinical experience those SBAs working in maternity unit especially labour ward had experience and assisted newborn with birth asphyxia with good outcome. Assessment of level of knowledge has shown no significant association but according to clinical experience, integration of knowledge into practice has shown good effect in adhering to the skills in newborn resuscitation. The SBAs were tested for the knowledge and most of the them scored below set standard of 80% according to HBB guideline. Decline in knowledge was also reported by other studies (Arlington *et al.*, 2017). Decline in knowledge could be due to lack of refresher training and health facilities are ought to strengthen this area.

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATION

Adherence to the HBB guideline in initial newborn resuscitation for Implementation of Helping Babies Breathe initiative depends largely on training of all BAs and proper documentation of HBB resuscitation outcome. To improve the outcomes of resuscitated newborns with birth asphyxia, we need well-experienced skilled Birth Attendants who are competent, have the ability to prepare resuscitation equipment and comfortable in resuscitation skills, including appropriate assessment of the newborn's condition immediately after delivery. There is a need to strengthen the training system. Training of all BAs could be possible if the HBB guideline especially initial newborn resuscitation being incorporated in curriculum of Nursing and Midwifery and other carders of health professional like clinical officers and medical doctors at all levels. Incorporation of guideline in initial newborn resuscitation will also help to expose SBAs to get more time during clinical practice. Continued efforts are needed to improve simulation training by the use of more realistic manikins as well as increased frequency of practice. Furthermore, on job, refresher training and continued supportive supervision in health facilities will improve and sustain better outcome in newborn resuscitation. Health facilities needs to use Health Information Management System in documenting the outcome of the newborn after resuscitation as recommended in the guideline for improving the working environment and for further references.

6.1 STUDY LIMITATION AND MITIGATION.

One of the selected health facilities with 12 participants was not flexible to be involved in the study. Therefore, to close this gap, the participants were added from the five health facilities by adjusting 10%. Therefore, this did not affect the sample size required.

The study results cannot be generalized due to the use of convenient sampling therefore; there is a need of other study to involve large sample size from lower level to higher levels of the health facilities.

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APPENDICES

Appendix A: Consent form to participate in a research

Introduction

My name is Tsafu Gaalu a Masters student at MUHAS. I am conducting a study on factors associated with the implementation of Helping Babies Breathe guidelines among skilled birth attendants at health facilities in Dar-es-salaam region. The information obtained from this study will be useful to the Ministry of Health Community development, Gender, Elderly and Children (MoHCDGEC) in developing strategies to improve the practice and enforce implementation of HBB guideline.

Participation in this research

Participation in this research is on voluntary basis, after reading and understanding the information provided in this document.

Privacy and confidentiality of the participants

All information will be treated with confidentiality no personal identification will be used.

Benefits for participating in this research

There are no direct potential individual benefits from participating in this study; however, the information obtained will help to promote and sustain the practice of HBB aiming at reducing neonatal death due birth asphyxia.

Risks for participating in this study

There are no anticipated risks for this study; the interviewer will handle any inconvenience.

Rights to participate or disagree to participate

The participant has the right to disagree or terminate from participating in this research at any time without interfering with the ward routinely services carried out.

Contact

In case of any questions, worries or any issues for clarification please contact the principal investigator through mobile number: 0754-640091 or 0715640091. Also for inquiry on your rights as a participant in this research, you can contact the Chairman of the Muhimbili Research and Publication Committee through Muhimbili University of Health and Allied Sciences, P.O. Box 65001, Dar es Salaam. Phone number: 2150302-6.

Agreed to participate

If you have agreed to participate in this study, please provide with your signature below:

I have understood all the information written above and all my questions have been answered. Therefore, I agree to participate in this study without any inducements or coercion.

Signature of the participant.....Date.....

Signature of the interviewer.....Date.....

Appendix B: Questionnaires (English version)
Part I

Socio demographic characteristics

1. Age: **Put tick**

- a) Below 25 years.....
- b) Between 26-35 years.....
- c) Between 36-45.....
- d) 46 years and above.....

2. Sex: **Put tick**

- a) Male.....
- b) Female.....

3. Marital status: **Put tick**

- a) Married b) Single

4. Educational level: **Put tick**

- a) Certificate b) Diploma c) Degree d) Masters e) PhD

5. Professional background. **Put tick**

- a) Registered Midwife b) Enrolled Nurse d) Registered Nurse

6. Working area/station: **Put tick**

- a) Labour ward
- b) Antenatal ward
- c) Post natal.....

7. Your working place/ type of health facility. **Put tick**

- a) Referral hospitals.....
- b) District hospitals.....

8. Operating agency: **Put a tick**

- a) Government.....
- b) Non-governmental organization/ private.....

Part II

Proportion of HBB trained birth attendants

9. Have you attended any the HBB training? Put tick

- a) YES.. If yes for how long?
- b) NO.....

If “YES”, go to question number 10. If “NO” go to number 11

10. What type of HBB training have you attended? **Tick all that applies**

- a) Formal (organized by MoHCDGEC)
- b) On job training (organized by health facility).....
- c) Refresher training.....
- d) Ordinary collage education.....

11. If “NO” mention at least 2 reasons of not attended the training

- a)
- b)

Part III

Individual factors associated with implementation of HBB initiative among birth attendants.

12. Working experience in maternity unit

- a) Less than 1 year.....
- b) One year and above.....

13. Are you implementing HBB guideline during neonatal resuscitation using action plan/HBB resuscitation chart?

- a) Yes.....
- b) No.....

14. How often do you use HBB guideline during newborn resuscitation? Put tick

- b) Always (once per week.....)
- c) Not using.....

15. In question number 13 if “NO” What do, you do if you recognize the baby is not breathing soon after delivery.

- a) Continue providing routine care.....
- b) Call help from an experienced midwife.....
- c) Other; specify.....

16. In question number 14 if “NOT using HBB guidelines,” mention at least 2 reasons of not using HBB guideline during newborn resuscitation.

- a)
- b)

17. How often do you practice the action plan and the skills of bag and mask ventilation- using mannequin?

- a) Always (i.e. weekly)
- b) Sometimes (Less than one day per week).....
- c) Not practicing.....

18. Number of supportive supervision on HBB you have received from your institutional trainer in the period of 3 months ago. **Put tick**

- a) None.....
- b) Once.....
- c) More than one.....

19. Does your facility offer Emergency Obstetric and Neonatal care (EmONC) services?

Put tick

- a) Yes.....
- b) No.....
- c) Do not know.....

20. Where do you record the resuscitation outcome during golden minute?

- a) In the partograph.....
- b) In report book.....
- c) None.....
- d) Others specify.....

Select the best answer to each question or statement; circle the letter of the correct answer.

(Assessing knowledge)

21. What should you do in the Golden Minute?

- a) Bathe the Baby
- b) Deliver the placenta
- c) Evaluate the Heart rate
- d) Help a baby if necessary

22. To prepare the area for delivery

- a) Open all the doors and windows to get fresh air
- b) Darken the room
- c) Make sure the area is clean warm and well lightened
- d) Keep the room temperature cold

23. Routine care for a healthy baby at birth includes

- a) Drying removing the wet clothes and bathing the baby
- b) Drying removing the net wet clothes and positioning the baby skin to skin

- c) Bathing and putting clean clothes on the baby
 - d) Drying and wrapping the baby in a wet clothe
24. When should the umbilical cord be clamped or tied and cut down during routine care?
- a) After the placenta is delivered
 - b) Around 1-3 minutes after birth
 - c) Immediately after the baby is born
 - d) Before the baby has cried
25. A baby is quiet, limp and not breathing at birth. What should you do?
- a) Dry the baby immediately
 - b) Shake the baby
 - c) Throw cold water on the face
 - d) Hold the baby upside down.
26. A newborn baby is quite, limp and not crying. The baby does not respond to steps to stimulate breathing. What should you do next?
- a) Slap the baby's back
 - b) Hold the baby upside down
 - c) Squeeze the baby's ribs
 - d) Begin ventilation.
27. In which situation should a baby be suctioned
- a) When a baby is crying at birth
 - b) When a baby is crying but there is meconium in the amniotic fluid
 - c) When you see secretions blocking the mouth and nose
 - d) Before drying the baby

28. Suctioning a baby unnecessarily or frequently can
- a) Cause a baby to stop breathing
 - b) Make a baby start coughing and breathing
 - c) Stimulate a baby to cry
 - d) Increase the baby's heart rate
29. A baby's is not moving with bag and mask ventilation. What should you do?
- a) Stop ventilation
 - b) Reapply the mask to get a better seal
 - c) Slap the baby's back
 - d) Give medicine to the baby
30. A new born baby's heart rate should be
- a) Faster than your heart rate
 - b) Slower than your rate
 - c) Checked before drying the baby
 - d) Checked only when the baby is crying
31. A baby who received ventilation
- a) Needs continued observation with mother
 - b) Cannot be fed
 - c) Always need advanced care
 - d) Should immediately receive antibiotics
32. When should the bag, mask, and suction device can be disinfected?
- a) After every use
 - b) Only when they appear dirty
 - c) Weekly
 - d) Once a month

33. Which babies need clearing of the airway with a suction device?

- a) Babies who have secretion blocking the mouth and nose
- b) All babies who not crying
- c) Babies who need to be stimulated
- d) Babies who need to be kept warm.

Providers perceived level of performance during resuscitation of newborn

(Assessing practice)

Scenario

You are going to assist at the birth of 37 weeks gestation baby. After 10 minutes, the mother delivered a baby, you recognized presence of meconium in the airway, and the baby is not breathing. The skills mentioned below in questions number 34 and 35 will help the baby breathe **BUT NOT** arranged properly in sequence therefore arrange in sequential order by writing on space provided using steps. i.e. Step 1, 2, 3, and 4

34. Golden minute: Clearing the airway. (Skills): Rearrange the steps in sequence

- i. Keeping the baby warm.....Step
- ii. Evaluating breathing.....Step
- iii. Clearing the airway- positioning the head and removing secretions.....Step
- iv. Providing stimulation to breathe.....Step

35. Golden minute Ventilation: (Skills): Rearrange the steps in sequence

- i. Checking for the mask.....Step
- ii. Positioning for ventilation.....Step
- iii. Ventilating with bag and mask.....Step
- iv. Evaluating and improving chest movement.....Step

Part IV

A) Institutional factors associated with implementation of HBB guideline among birth attendants.

36) Number of supportive supervision you have received on HBB during clinical practice from your institutional trainer in the period of 3 months ago. **Put tick**

- a) Once.....
- b) More than one.....

37) Does your facility offer Emergency Obstetric and Neonatal care (EmONC) services and neonatal care integrated into EmONC? **Put tick**

- a) Yes.....
- b) No.....
- c) Do not know.....

38). Where do you record/Documentation the resuscitation outcome during golden minute?

- a) In the partograph.....
- b) In report book.....
- c) None.....

39). Number of client/patients you normally attend per shift (staffing/ client-patient ratio)

- a) Less than six.....
- b) More than six.....

40) Does your hospital-mobilized funds for HBB Training.

- a) Yes.....
- b) No.....

Appendix C: Ethical clearance

**MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES
OFFICE OF THE DIRECTOR OF POSTGRADUATE STUDIES**

P.O. Box 65001
DAR ES SALAAM
TANZANIA
Web: www.muhas.ac.tz



Tel G/Line: +255-22-2150302/6 Ext. 1015
Direct Line: +255-22-2151378
Telefax: +255-22-2150465
E-mail: dpgs@muhas.ac.tz

**Ref. No. HD/MUH/T.379/2018/02
IRB#: MUHAS-REC-06-2020-299**

18th June 2020

Tsafu Gaalu
MSc. Midwifery and Women's Health
School of Nursing,
MUHAS.

RE: APPROVAL OF ETHICAL CLEARANCE FOR A STUDY TITLED "FACTORS ASSOCIATED WITH THE IMPLEMENTATION OF HELPING BABIES BREATHER INITIATIVE AMONG BIRTH ATTENDANTS AT HEALTH FACILITIES IN DAR ES SALAAM."

Reference is made to the above heading.

I am pleased to inform you that, the Chairman has, on behalf of the Senate, approved ethical clearance for the above-mentioned study. Hence you may proceed with the planned study.

The ethical clearance is valid for one year only, from **18th June, 2020 to 17th June, 2021**. In case you do not complete data analysis and dissertation report writing by **17th June, 2021**, you will have to apply for renewal of ethical clearance prior to the expiry date.

Dr. Emmanuel Balandya
ACTING: DIRECTOR OF POSTGRADUATE STUDIES

cc: Director of Research and Publications
cc: Dean, School of Nursing, **MUHAS**

Appendix D: Request letter to conduct study

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES OFFICE OF THE DIRECTOR OF POSTGRADUATE STUDIES

P.O. Box 65001
DAR ES SALAAM
TANZANIA
Web: www.muhas.ac.tz



Tel G/Line: +255-22-2150302/6 Ext. 1015
Direct Line: +255-22-2151378
Telefax: +255-22-2150465
E-mail: dpgs@muhas.ac.tz

Ref. No. HD/MUH/T.379//2018

Executive Director,
Mwananyamala Hospital,
P.O. Box 61665,
DSM.

*CSCo
shughulika
thiale, Agmo
26/05/2020*



*ilipiwe Tsh 50,000=
kisha awasilishe
nsiti na kuendelea
na utafiti
Tubamu
CSCo
26/06/20*

Re: INTRODUCTION LETTER

The bearer of this letter is Tsafu Gaalu, a student at Muhimbili University of Health and Allied Sciences (MUHAS) pursuing MSc. Midwifery and Women's Health.

As part of her studies she intends to do a study titled: "FACTORS ASSOCIATED WITH THE IMPLEMENTATION OF HELPING BABIES BREATHER INITIATIVE AMONG BIRTH ATTENDANTS AT HEALTH FACILITIES IN DAR ES SALAAM."

The research has been approved by the Chairman of University Senate.

Kindly provide her the necessary assistance to facilitate the conduct of her research.

We thank you for your cooperation.

Ms. Victoria Mwanilwa
For: DIRECTOR, POSTGRADUATE STUDIES


cc: Dean, School of Nursing, MUHAS
cc: Tsafu Gaalu -0754640091 | 0715640091

Appendix E: Permission letter to conduct study

KINONDONI MUNICIPAL COUNCIL
ALL CORRESPONDENCES TO BE ADDRESSED TO THE MUNICIPAL DIRECTOR

Tel: 2170173
Fax: 2172606

In reply please quote:
Ref. NO: KMC/HEALTH



MUNICIPAL MEDICAL OFFICER OF HEALTH
KINONDONI MUNICIPAL COUNCIL,
S.L.P 61665,
DAR ES SALAAM.

Date: 8/7/2020

Health Facility I/C,
H. Karurui Hosp, TMS HOSPITAL
Kinondoni Municipal Council.

REF: RESEARCH PERMIT.

Refer to the heading above.

DMO office is pleased to inform your health facility that ISAFU GAMLU, which is from MULTAS has been given a permit to perform the research work in your facility stating from 9th July, 2020 to 30th July, 2020. The research is titled, FACTORS ASSOCIATED WITH IMPLEMENTATION OF HELPING BABIES BREATHE INITIATIVE AMONG BIRTH ATTENDANTS AT HEALTH FACILITIES IN DAR ES-SALAAM.

Kindly receive and provide the necessary assistance in order to enable the student/ organization to fulfil the activities comfortably.

Best wishes.

[Signature]
Research Coordinator
KINONDONI MUNICIPAL COUNCIL

For: MUNICIPAL MEDICAL OFFICER OF HEALTH
KINONDONI MUNICIPAL COUNCIL

NB: please share research report with MMOH Office at the end of your study

UNITED REPUBLIC OF TANZANIA
 MINISTRY OF HEALTH, COMMUNITY DEVELOPMENT, GENDER,
 ELDER AND CHILDREN

DAR ES SALAAM REGION
 ADDRESS: "HEALTH"
 PHONE: 022 - 2861903



AMANA REGIONAL REFERRAL
 HOSPITAL
 P.O. BOX. 25411
 DAR ES SALAAM.

IN REPLY PLEASE QUOTE

29/6/2020

REF. NO. MOHCDGEC/ARRH/R.I/XI/41

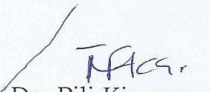
Director, Postgraduate Studies,
 Muhimbili University of Health and Allied Sciences,
 P.O. Box 65001
DAR-ES-SALAAM.

RE: PERMISSION TO CONDUCT RESEARCH AND COLLECT DATA

Refer to your letter which dated 22nd June, 2020 which requested us to allow Tsafu Gaalu to conduct research and collect data in our institution.

We are here to acknowledge your request with the following conditions, that she must submit the results of her research after completion of analysis in order the hospital to make use of the data's to solve hospital problems.

Regards.


 Dr. Pili Kimanga

**FOR: MEDICAL OFFICER INCHARGE
 AMANA REGIONAL REFERRAL HOSPITAL**

For:
 MEDICAL OFFICER I/C
 AMANA REGIONAL REFERRAL HOSPITAL
 P. O. Box 25411
 DAR-ES-SALAAM

UNITED REPUBLIC OF TANZANIA
MINISTRY OF HEALTH, COMMUNITY DEVELOPMENT, GENDER, ELDERLY
AND CHILDREN

DAR ES SALAAM REGIONAL

ADDRESS: Health'
TELL:Na: +255 -758 908110
fax Na:
Email: temekerh@afya.go.tz



Temeke Referral Hospital
P.O.; BOX 45232,
DAR ES SALAAM.

Tarehe 20/6/2020

REF. NO TRR/HRS/C/9/3/20

NAME: TSAFU GAALU
P.O. Box 6500
Institution: MUHHA

RE: REQUEST FOR RESEARCH

Refer to the letter dated 22nd June 2020 with Ref. No: HO/MUHA/T.379/2018.
From: MUHHA

I would like to inform you that your request for a research intends to do a study titled *PROBLEMS ASSOCIATED WITH THE IMPLEMENTATION OF HELPIVA BABIES BREATHERS INITIATIVE* ATTENDANTS AT HEALTH FACILITIES IN DAR-ES-SALAAM is accepted. Furthermore, there is no financial obligation for this request and you should report to the head of OBGYN after receiving this latter for your study.

Also you should copy with rules, laws, regulations and order of Temeke Regional Referral Hospital for the period of your study.

Regards,

FOR: MEDICAL OFFICER INCHARGE
TEMEKE REGIONAL REFERRAL HOSPITAL

Maji NGANGA MKUU
HOSPITALI YA MAMISPA YA TEMEKU

Copy to:

- The Head of Department Research (Study), 6500
P.O. Box
INSTITUTION: MUHHA
- Head of OBGYN -
Temeke Regional Referral Hospital
Kindly assist for HER Research

UBUNGO MUNICIPAL COUNCIL

ALL CORRESPONDENCES TO BE ADDRESSED TO THE MUNICIPAL DIRECTOR

Tel: 0222 - 926341
 Fax: 0222 - 926342
 Email: info@ubungomc.go.tz
 Website: www.ubungomc.go.tz



P.O. BOX 55068
 DAR ES SALAAM

In reply please quote:

TAREHE: 09/07/2020

Ref. No. UMC/R.18/01A/39

Facility In Charge,
 Sinza Hospital,
UBUNGO MUNICIPAL COUNCIL

REF: RESEARCH PERMIT

Refer to the above heading.

DMO's office is pleased to inform your health facility that **TSAFU GAALU** which is/from Muhimbili University of Health and Allied Sciences (**MUHAS**). Has been given a permit to perform the Research work in your facility starting from **14/07/2020** to **21/07/2020**. The Research is titled "**FACTORS ASSOCIATED WITH THE IMPLEMENTATION OF HELPING BABIES BREATHER INITIATIVE AMONG BIRTH ATTENDANTS AT HEALTH FACILITIES IN DAR ES SALAAM**"

Kindly receive and provide the necessary assistance in order to enable the student to fulfill the activities comfortably.

Best Wishes,

Kny: MGA... MANUSPAA
 HALMASH... UBUNGO

Frank P. Kwai

For: **MUNICIPAL MEDICAL OFFICER**
UBUNGO MUNICIPAL COUNCIL

NB: Please share research report with MMOH Office at the end of your study.