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Effectiveness of Low-Dose High-Frequency Helping Babies Breathe (HBB) Training Intervention on Knowledge and Skills of Community Midwives

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Abstract

This study is intended to assess the effectiveness of a low-dose high-frequency Helping Babies Breathe (HBB) training intervention on the knowledge and skills of community midwives in the four private secondary care hospitals in Karachi, Pakistan. This study used a quantitative research approach, using randomized controlled trials. The target population was Community midwives. A simple random sampling method was used and 94 participants were selected. The primary investigator (PI) has randomized the institution out of four study settings. Two from interventional group and two from controlled group. The duration of the study was four months, from October 2022 to February 2023. The developed and pre-tested modules and instruments were used which has 18 items. The score compared on knowledge before and after initial HBB training and after 2 months. Study results revealed that there was a significant difference present in the pair of pre-post, pre-follow-up, and post-follow-up phases.

Keywords: Low Dose High Frequency, Helping Babies Breathe, Training Intervention.

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Title

Effectiveness of Low Dose High Frequency Helping Babies Breathe Training Intervention on Knowledge and Skills of Community Midwives

Abstract

This study is intended to assess the effectiveness of a low-dose high-frequency Helping Babies Breathe (HBB) training intervention on the knowledge and skills of community midwives in the four private secondary care hospitals in Karachi, Pakistan. This study used a quantitative research approach, using randomized controlled trials. The target population was Community midwives. A simple random sampling method was used and 94 participants were selected. The primary investigator (PI) has randomized the institution out of four study settings. Two from interventional group and two from controlled group. The duration of the study was four months, from October 2022 to February 2023. The developed and pre-tested modules and instruments were used which has 18 items. The score compared on knowledge before and after initial HBB training and after 2 months. Study results revealed that there was a significant difference present in the pair of pre-post, pre-follow-up, and post-follow-up phases.

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Contents

Introduction

Regrettably, approximately 6,700 infants perish each day. Between 2018 and 2022, the World Health Organization reported that 2.4 million newborns died worldwide, with 98% of these deaths occurring in low- and middle-income countries. On the first day of the neonatal period, which encompasses the first 28 days of life, seventy-five percent of newborn fatalities occur. Newborn infection, hypoxia, and premature birth are among the most prevalent causes of neonatal health complications (World Health Organization, 2019). Ten specific nations, the majority of which are located in Asia, account for over 65% of all newborn fatalities worldwide. Out of these ten countries, Pakistan comes in third place in terms of newborn mortality. 2019 saw the National Institute of Population Studies. In addition, the World Health Organization's Global Status Report shows that the neonatal death rate significantly decreased between 1990 and 2015 by 47% (WHO, Global Status Report).

Even by 2030, the rate of decline will have surpassed the sustainable development objective of

fewer than 12 newborn deaths per 1000 live births, but at a slower rate in most disadvantaged areas. A population-based study conducted in a small Pakistani town revealed that there were 34.8 premature deaths for every 1000 live births. Additionally, it was discovered that there were 70.4 neonatal early deaths for every 1000 live births and 33.6 stillbirths for every 1000 live births. In this neighborhood, asphyxia was responsible for 26% of baby deaths, according to a 2009 study by Jehan et al. on 1121 private births. In 2021, the World Health Organization (WHO) released an information sheet indicating that babies who are at risk of dying within the first month of their lives are more likely to suffer from a range of health problems. As essential members of Pakistan's primary healthcare system, community-based midwives have contributed significantly to the country's 2021 reduction of newborn mortality, which has dropped by more than 80%.

According to the findings of Perry, et al. (2021), having access to midwifery services can contribute to the reduction of health inequities on a global scale. Providing opportunities for those who are underprivileged is one way to accomplish this goal. As soon as these services are put into place, the delivery of health care will become more effective, efficient, and economical (Imran & Akhtar, 2023). It has been found that in a number of countries, improvements in the availability and access to primary care and midwifery services have been connected with lower rates of maternal mortality, as well as improvements in the quality of professional care for pregnant women (Khowaja et al., 2022) Community midwives who possess the requisite qualifications and experience have the ability to drastically lower the incidence of infant mortality and birth defects, as stated in the research conducted by Naz et al. (2022). Solutions have been established through research to reduce neonatal mortality. These solutions include those for obstetric complications, infection, preterm birth, and low birth weight Supplements with high levels of iron and micronutrients, prenatal nutrition counseling, and prenatal care are some methods of providing prenatal and prenatal care to mothers who fall into this category, observed mortality in neonates Reduces and Primary resuscitation, kangaroo maternal care, umbilical cord care, . and exclusive breastfeeding are some of the important strategies that have been shown to effectively reduce infant mortality (Rasul et al., 2018). In addition, there are other important steps that have been proven to achieve this goal (Phulpoto, Oad & Imran, 2024). The use of these strategies significantly improves the chances of newborn survival and promotes better health outcomes. Furthermore, according to Esan et al.'s research from 2020, the quality of medical treatment that the mother receives shortly after giving birth is a significant factor in determining the baby's chances of survival and general health. Both at home and in the hospital, this is the case when the baby is born. In addition to this, it highlights the importance of having skilled medical professionals to safeguard the health and safety of infants during the challenging period that immediately follows birth.

Helping Babies Breathe (HBB) was established by the American Academy of Pediatrics (AAP) in 2017, the United States Agency for International Development (USAID), the World Health Organization (WHO), and a large number of other stakeholders in order to address this pressing need. The organization's primary focus is on decision-making, which is referred to as the "Golden Minute." It is intended to improve the effectiveness of baby resuscitation, and it takes place soon after the commencement of the procedure. Recent research (Naz et al., 2022) investigates the broader role that community midwives who are both professional and experienced play in preventing abnormal births, which ultimately leads to a reduction in infant mortality.

Objectives of the Study

1. To assess the knowledge levels of Community Midwives (CMWs) after participating in a Low Dosage High Frequency (LDHF) Helping Baby Breathe (HBB) training intervention.
2. To evaluate the skill abilities of Community Midwives (CMWs) following the LDHF Helping Baby Breathe (HBB) training.
3. To determine the overall impact of the LDHF Helping Baby Breathe (HBB) training intervention on the knowledge and skills of Community Midwives (CMWs)

Research Question

1. What is the impact of the Low Dose High Frequency Helping Baby Breath training intervention on Community Midwives' knowledge and skill sets?

Literature Review

Newborn mortality and morbidity statistics show that every year, almost 2.4 million people die around the world (Becker et al., 2022), which is a huge and

concerning amount. Worryingly, nearly all of these deaths (99%) take place in countries with low or medium incomes, where public health and hospital resources are often inadequate. A sobering reminder of how treacherous the arrival of a new kid may provide life. The fact that it prompts us to consider how vital it is to ensure the safety of infants is appreciated. The meaning of life and the things that truly matter are also brought to our attention by this. According to Rosa-Mangere et al. (2022), the United Nations has prioritized the reduction of neonatal mortality as one of its sustainable development goals, recognizing the urgency of the situation.

We have a responsibility to create a society where every child has the opportunity to grow and succeed. We are committed to enhancing the quality of life and progress by providing loving care to newborns and putting their well-being first. Our long-term goal is to create a happy and abundant future for all by providing loving care for newborns. Infant mortality rates in affluent and developing countries are very different from each other, and that is a striking difference. Maternal mortality in industrialized countries is as low as 3.4 per 1000 live births but nine times higher than in the least developed countries (Sampurna et al., 2023) This highlights the difference between the two situations the oath of the emphasis (Bernardino et al., 2022; UNICEF, 2023). This represents a significant decrease from the previous rate of 43 per 1000 live births. The data presented here illustrate the importance of early intervention to increase newborn survival across the country. Finding out that evidence-based care has demonstrated promising results in lowering infant mortality is a reassuring fact to take into consideration. It was demonstrated that the rates of infant mortality dropped by fifty percent when first responders diagnosed the problem and carried out resuscitation procedures shortly after the birth of the infant (Shukla et al., 2022).

As a result of this amazing achievement, first responders in countries with high incomes are now receiving training in high-fidelity resuscitation procedures, and nations with low and moderate incomes are already following suit (Vadla et al., 2022). In the critical field of neonatal care, where every breath is key, the success of training interventions is vital for the improvement of outcomes for our youngest patients. This is because every breath is as important as the next. From the moment they are born, infants require the assistance of their community midwives in order to breathe in a manner that is both comfortable and active. The importance of these findings is the fact that to equip physicians and emergency personnel with the skills needed to save infants it is necessary to prioritize early diagnosis and resuscitation strategies infant mortality rates have fallen dramatically worldwide, especially in countries like Pakistan where (2019), skilled birth attendants play an important role in reducing maternity care delivery and infant mortality in low- and middle-income countries because birth attendants in these countries are expensive and accessible, enabling these challenges to be addressed effectively.

As an end result of midwifery programs, the shipping of perinatal care has become greener and more effective, which has led to upgrades in socioeconomic components and a fine of existence (Yamamoto & Kataoka, 2023). Nurses and midwives who are knowledgeable in providing inpatient and community health insurance are extremely critical in this unique placement due to the fact they may be the first people to provide cardiopulmonary resuscitation (CPR) to a newborn baby inside the moments immediately following delivery. Their significant contribution to the enhancement of the outcomes for newborns is brought to light by this (Karlsson et al., 2023). With this information in mind, we decided to conduct research that would break new ground by investigating the ways in which the knowledge, skills, and capacities of community midwives in the most important profession of helping babies breathe may be improved through the implementation of training interventions. Obstetricians and midwives have the direct responsibility of assisting neonates in breathing after birth. This demonstrates the actual application of midwives' knowledge and the potential for it to save lives (Pozzi et al., 2020).

Due to the ever-changing nature of the healthcare industry, midwives are required to always push themselves to learn more and improve their skills in order to better serve their patients. Courses that might be a part of the Neonatal Resuscitation Program (NRP) are a fantastic instance of this due to the fact they are challenged to ongoing updates in order to agree to the standards which are installed by way of reliable organizations such as the American Society of Pediatrics (Ibrahim & Vats, 2023). These complete publications, which can be fabricated from ongoing professional development (CPD), continuing schooling (CE), and lifetime learning (SL) (Cavicchiolo et al., 2018), carry to mild the importance of providing midwives with opportunities to keep their schooling and improve their talents. According to Helping Babies Breathe (HBB), opposite to the vast belief, neonatal

extensive care institutions are not the handiest places wherein new child resuscitation is performed. According to Taylor et al.'s research from 2020, encouraging the concept of typically getting admission to primary new child resuscitation is something that must be completed irrespective of where a baby is born. It has to be stated that there's a big demand for similar literature on persevering with expert improvement (CPD) programs for midwives in poor nations. According to Hainsworth et al. (2021), one of the likely factors for this phenomenon is that midwives operating in those settings have constrained the right of entry to resources and capacity research opportunities.

Midwives in industrialized nations like Australia and Canada, however, are required to actively participate in continuing expert improvement (CPD) sports with the aid of regulatory companies. This is a requirement that is rather valued. According to Johnston et al. (2022), this demonstrates how essential it is for those varieties of environments to have ongoing academic possibilities. The insurance of midwives has been carefully prolonged from hospitals to network fitness centers, primarily based on the reality that they're very informed about the way to decrease the mortality charge of toddlers. Helping Babies Breathe is one of the programs that pursues to provide midwives with the know-how and abilities vital to tackle the problem of asphyxia after start, that's one of the number one reasons for dying and morbidity amongst newborns (Morris et al., 2020). Utilizing curricula that are both concentrated and simplified, these programs offer standardized recommendations for obstetricians and midwives. These programs offer these recommendations. According to Mubeen et al. (2021), this program emphasizes active learning, simulation-based training, peer practice, cooperation, effective communication, reflective learning, and self-improvement to develop competent healthcare staff. As a whole, neonatal death rates are heavily impacted by socioeconomic variables, especially in areas with few resources. To improve infant outcomes, skilled delivery attendants, such as midwives, are essential. The worldwide rate of infant death decreased by 51% between 1990 and 2017, while it remains high in some areas and nations. Among the world's regions with the highest rates of maternal mortality in 2017, Sub-Saharan Africa ranked 27th with 1,000 live births (Wilson et al., 2020). According to recent research evaluations, the contextual-specific effect of the Helping Babies Breath course is quite significant in Pakistan (Khadduri et al., 2008). Home births attended by unskilled midwives (dais) were prevalent in Pakistan's history. Clean delivery procedures were seldom put into practice, even though they were known to have benefits (Siddiqui & Smith-Morris, 2022). Warmth maintenance has come a long way, however, practices including pre-lacteal feeding, delayed breastfeeding start, and avoiding colostrum have declined in popularity (Memon et al., 2019). Also eliminated with more sanitary ways are traditional cord care practices, which included things like coating the cord stump with ghee and making unclean incisions. Most women who gave birth reported eating well, but few drank alcohol after giving birth (Ahmed et al., 2020). Community midwives' understanding, perspective, and approach to patient care are greatly influenced by the aforementioned course, Helping Babies Breathe (Naz et al., 2022).

Methodology

Karachi, Pakistan served as the location for the research that was carried out at four secondary-level hospitals. Murshid Hospital & Health Care Centre, Fatimiyah Hospital, Kohi Goth Hospital, and Ameen General Hospital are the hospitals that are included in this list. These four hospitals are primarily responsible for providing services related to labor and delivery, antenatal care, maternal care, and childcare. The Randomized Controlled Trial methodology was employed in this study to address the research query. This investigation aimed to evaluate the efficacy of a low-dose, high-frequency intervention for infant breath training on the knowledge and skills of community midwives. The target population for this research was Community Midwives (CMWs), who are responsible for providing essential antenatal, postnatal, maternal, and child healthcare services at the study site. The Open Epi info software version 3.0 was employed to determine the sample size. The sample size was determined at a 95% confidence interval, with a power of study 1-□ of 80%. The reference study conducted by Draiko, Khemika, and Panza (2017) was employed to calculate the sample. Considering the component of knowledge, the difference of 55.3% before and after helping babies breathe training interventions for improving knowledge. The calculated sample size was 84. Considering the non-respondents of participants, 10% has been increased, the final sample size was 94 which is equally distributed between both groups. A simple random sampling method was used to enroll the participants. It is a probability sampling technique that provides each participant with an equal chance of being

in the study (Polit & Beck, 2012). The primary Investigator (PI) has randomized the institution out of four study settings. Two were placed into the interventional group and two were in the controlled group. This study was conducted within four months from Oct 2022 to Feb 2023 after the BASR approval. Eligibility Criteria: The study participants were selected based on the inclusion and exclusion criteria.

Study Instrument:

The structured and validated tool was utilized for the collection of the data. The tool consisted of 2 components. The participants were assessed with four Helping Baby Breath assessments, such as Component 1. Demographic Characteristics: This part of the tool consisted of information related to variables such as age, gender, professional qualification, educational institute, and years of experience Component 2. Knowledge assessment: this part consisted of 18 Multiple-Choice Questions (MCQs) that have information related to immediate postnatal care, golden minute, airway management, effective ventilation techniques, and the importance of early intervention. The knowledge has been assisted as pass and fail the participants who scored < 80 % were considered low knowledge and those who scored ≥ 80% were considered as high knowledge. Data Collection Procedure: The data was collected over four months following the study's approval by the respective committees. Permissions were obtained from all study settings. Two settings were designated as the interventional group and two as the control group, determined by sealed envelopes. Upon receiving approval, the primary investigator (PI) contacted the unit in charge or manager to recruit potential participants. Both groups underwent a pre-test and received the intervention. Immediately after the intervention, a post-test was conducted. The interventional group then received a low-dose, high-frequency intervention once a week for 45 minutes over two months, while the control group did not. After four months, a second post-test was conducted for both groups.

Data Analysis

Demographics

Table 1

Descriptive Statistics Of Demographic Characteristics Variable

Age	Frequency (%) n=94
<20 Years	23 (24.5%)
21_30 Years	53 (56.4%)
31_40 Years	13 (13.8%)
>40 Years	5 (5.3%)
Academic Qualification	
Metric	29 (30.9%)
Intermediate	56 (59.6%)
Graduation	09 (9.6%)
Professional Qualification	
Community Midwives	88 (93.6%)
Registered Nurse Midwives	06 (6.4%)
Professional Experience	
< 1 Year	00(0%)
1 to 5 Years	67(71.3%)
6 to 10 Years	25 (26.6%)
11 and above	02 (2.1%)
Have you ever received HBB Training?	
Yes	00 (0%)
No	94 (100%)

The study comprised a total of 94 participants, with a focus on their socio-demographic characteristics. The age distribution revealed that the majority fell within the 21-30 years age group, representing 56.4% of the sample (n = 53). The second-largest group consisted of participants under 20 years, constituting 24.5% (n = 23). Those aged 31-40 years comprised 13.8% (n = 13), while individuals over 40 years constituted a smaller proportion at 5.3% (n = 5). In terms of academic qualifications, a substantial 59.6% (n = 56) held an intermediate qualification, followed by 30.9% (n = 29) with a metric qualification, and a smaller contingent of 9.6% (n = 9) with a graduation qualification. Professionally, the majority 93.6%, (n = 88) were community midwives, contrasting with the 6.4% (n = 6) who were nurse midwives. Regarding professional experience, none reported less than 1 year, 71.3% (n = 67) had 1 to 5 years, 26.6% (n = 25) reported 6 to 10 years, and a minimal 2.1% (n = 2) possessed 11 or more years of experience. Concerning prior training in HBB or neonatal resuscitation, none of the participants 0%, (n = 0) had received such training. All participants 100%, (n = 94) confirmed that they had not undergone any previous training in this specific area.

Effectiveness of HBB Training Intervention on Knowledge of all CMWs among control and interventional groups in the PRE-POST and follow-up phase

Table 2

Pairwise Comparisons of Knowledge

	Control (n=47)			Intervention (n=47)		
	Mean Difference	std error	p-value	Mean Difference	std error	p-value
Knowledge						
pre-post	-8.340*	0.47	<0.001*	-8.404*	0.337	<0.001*
pre-follow-up	-4.617*	0.424	<0.001*	-6.596*	0.32	<0.001*
post-follow-up	3.723*	0.39	<0.001*	1.809*	0.354	<0.001*

The effectiveness of the HBB Training Intervention on the Knowledge and Skills of all CMWs in the pre-post and follow-up phases is displayed in the table for both the control and interventional groups. While no significant effectiveness was discovered in the pre and post-phase, it was noticed that there was a significant difference in the knowledge scores of CMWs in the follow-up phase. In the control group, scores were 10 (1), but in the interventional group, scores jumped to 13 (4) (p-value <0.001).

Discussion

The current study assessed the effectiveness of the simulation-based Low Dose High-Frequency Helping Baby Breath training intervention on the knowledge and skills retention of Community Midwives. One of the significant findings in the current study was that none of the participants, which is 0% (n = 0), had been trained in HBB or neonatal resuscitation. Since community midwives were unprepared to help neonates with respiratory problems and during delivery, their lowest pre-test score revealed their lack of training. Findings from this study are consistent with those from (Bang et al., 2016), which found that TBAs did not receive any training in newborn resuscitation. Because of this, adding the Helping Babies Breathe module to the training of community midwives is very important. Helping Babies Breathe projects increased the competence and expertise of community midwives, according to the literature review. Competence and training are necessary for the efficient implementation of neonatal resuscitation recommendations with low-dose and high-frequency models, which are supported by strong evidence (Naz et al., 2022).

After reviewing the research extensively, Evans et al. (2018) found that low-dose, high-frequency newborn resuscitation training was associated with better baby outcomes. The issue research has evaluated the impact of both conventional training and low-dose, high-frequency training methods. The results demonstrated that the control group scored 83.1 on the knowledge retention test, while the intervention group scored 82.74, indicating that the two groups were substantially similar. While there was a slight

decrease in understanding from the initial test to the 2-month follow-up for both groups, the decrease was more pronounced in the control group (from 83% to 59%) compared to the intervention group (from 82% to 73.48%). This difference was statistically significant ($p=0.001$), indicating that the intervention had a notable impact on knowledge retention. Similarly, when examining skill retention, the intervention group outperformed the control group. Despite both groups experiencing a drop in skills after the initial test, the decrease was less severe in the intervention group. Notably, in OSCE B, where early intervention was implemented, both groups showed improvement, with the intervention group displaying higher competence scores throughout.

Conclusion

In the provided table, we comprehensively analyzed knowledge by comparing all CMWs in both the control and treatment groups. Statistical analysis of the Control group revealed a significant difference in knowledge levels across the pre-post, pre-follow-up, and post-follow-up phases (p-values <0.001).

Recommendation

The paradigm has been shifted from traditional classroom teaching to LDHF onsite training. LDHF practice is prominent in tertiary-level hospitals and is internationally recognized in Pakistan. A study of low-dose, high-frequency training in community midwives in the community context of Pakistan is recommended to be a great breakthrough in combating disparities by enhancing training and brain human resources.

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