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Parental Practice of Providing Care for their Infants Receiving Vaccination: Pilot Study

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ABSTRACT

Providing effective health care for infants who receive immunization is very of a strong necessity for their health and safety. According to immunization can cause adverse effects in various types, which call as Adverse Events Following Immunization (AEFI). The AEFI usually can occur in various types such as skin rash and redness, fever, and pain. In case of severe side effects; anaphylactic shock may occur. Therefore, parents need to provide health care for their young children. This pilot study was aimed at studying how parents provide care for their infants about vaccination at one hospital in Thailand. Ten parents of infants were purposive selection. Data were collected by interview and observation with record form. Data analysis was done through content analysis and descriptive statistic methods.

The findings displayed all parents took their infants for vaccination without checking the names and benefits of the vaccines. Two grandmothers gave medicine for relieving the fever of their infants both before and after vaccination. During vaccination, eight parents could not hold their infants appropriately. Five parents did not know how to support their infants during the injection. One grandmother relieved the fever of her infant by soaking in warm water mixed with limejuice. Two grandparents applied the balm and herbal medicated oil for relieving edema and pain at the injection area. Three grandparents applied herbal powder at the vaccinated area to decrease inflammation. All of them did not know of and thus did not observe AEFI events. Ultimately, the pilot study reflects the limitation of knowledge, beliefs, and practice among parents in relation to vaccination care for their infants. Thus, nurses and health personnel should create and provide family health education for enhancing relevant knowledge, beliefs, and skills for parents of infants.

Keywords

Parental Practice, Vaccination, Infants, AEFI.

Introduction

Infancy is a period in which humans have low immunity. Despite some level of immunity received from mother through placenta, full protection from some types of illness is not guaranteed [1]. Moreover, immunity will decrease after childbirth. In particular, immunity against bacteria will deplete approximately 1-2 months after childbirth [2]. An infant will gradually develop immunity, although still of low level during the first year. This frequently enables risks of illnesses and deaths [3,4]. Immunization with vaccination is therefore of high necessity, in order to prevent illnesses induced by preventable diseases, and to prevent transmission of diseases to other people [5]. A vaccine is a biological product invented to stimulate body immunization; vaccination is thus inoculation of specific antigen components into a human body. A period is needed for body to stimulate immunity by creating antibodies [5] and memorizing that particular antigen to prevent related infections [6-7]. Accordingly, the immune system responds faster and more efficiently than during the first contact [5,7]. Vaccination is therefore regarded as appropriate immunization, with long-lasting and safe effects [6]. It helps reduce economic loss nationally in terms of human resources and

expenses in care and treatment for patients. Apart from the benefit of immunization to prevent infection from pathogens within environment, vaccination also prevents transmission of illnesses to other people of close proximity [5,8,9].

Currently, vaccines are categorized into 3 groups [10,11]: 1) Toxoid, which is used to prevent illness induced by toxin of bacteria. Its production involves neutralization of bacterial toxin, although at the level which stimulates immunization. Toxoid includes but is not limited to, diphtheria vaccine and tetanus vaccine. After receiving a toxoid, typically, a patient will develop fever or slight specific reaction. However, if a patient has frequently received toxoid or possess high level of immunity, higher number of specific reactions could be observed e.g., swelling, redness, pain at the point of injection, and fever; 2) Inactivated vaccine, which has 2 subcategories, including 2.1) Whole-cell vaccine or Whole virion vaccine, such as whole-cell pertussis vaccine and inactivated poliovirus vaccine (IPV). These vaccines tend to cause reactions at the injection area or fever. The mentioned symptoms commonly appear 3-4 hours after injection and maintain for 1-2 days. 2.2) Acellular vaccine, which has low level of reaction after injection. This type of vaccine comprises Hepatitis B vaccine, Hib vaccine, Acellular Pertussis vaccine, and Pneumococcal vaccine; 3) Live attenuated vaccine, which is produced from live pathogen with reduced virulence. This group of vaccine includes, for instance, Oral Poliomyelitis Vaccine (OPV) and Rotavirus vaccine. When introduced into a human body, this type of vaccine will not have immediate effect. Accordingly, understanding characteristics of each vaccine type as well as their possible effects are significant. Relevant observation and care for emerging symptoms from inoculation of vaccine could therefore be conducted appropriately and safely.

As mentioned above, an infant has a higher risk of infection and illness from an epidemic than people of other ages [2]. Ministry of Public Health, accordingly, defines basic vaccination services as mandatory to every infant, emphasizing vaccines to prevent significantly problematic illnesses. In this regard, 8 types of vaccines that could prevent 12 types of illness were defined in 2020 [10]; including tuberculosis vaccine (Bacillus Calmette–Guérin: BCG) , Hepatitis B vaccine (HB), the pentavalent vaccine against diphtheria, tetanus, whooping cough, hepatitis B and Haemophilus influenza type B (DTP-HB-Hib), Rotavirus vaccine, Oral Poliomyelitis Vaccine (OPV), inactivated poliovirus vaccine (IPV), Measles, Mumps, and Rubella (MMR) vaccine, and Live Attenuated Japanese Encephalitis (LAJE) vaccine. Each of these vaccines should be inoculated in each period of life as defined in the mom and baby health log provided to every mother and family before discharge from the postnatal care service setting in Thailand [10].

Although production of vaccines has undergone safety and quality validation procedures, adverse events following immunization (AEFI) are nevertheless possible [11-16]. These possible medical disorders are unnecessarily derived from vaccination. In some cases, the events might involve undesirable or unexpected events, abnormal laboratory results, physical signs, or illnesses [11,17]. Vaccine-induced undesirable symptoms, in most cases, occur from excessive response to inflammation and immunization. On some occasions, the symptoms are severe, which are related to several and different factors; both internal and external [12]. Mostly the symptoms are not severe, including fever, ache, and redness at the injection area. The symptoms could also be severe, however of rare occasions [4,7] e.g., febrile seizure, crying and annoying, and severe allergy [10]. AEFI is a significant issue with effects on family. It can also affect dramatically person and family decision-making on vaccination.

World Health Organization (WHO) categorizes AEFIs into 5 types [11,15]: Type 1) vaccine product- related reaction; Type 2) vaccine quality defect-related reaction, as well as equipment management. Reactions from these 2 vaccine types are twofold. First, common, minor vaccine reactions [4] from response of immunity system. The reactions tend to occur 1-2 days after vaccination, including local reactions (e.g, pain, swelling, and redness) which commonly occur within 5 days of vaccination, except BCG vaccines, which tend to cause the reactions within or more than 2 weeks after [4]. The common, minor reactions also cover systematic reactions—e.g., fever, muscle pain, headache, and anorexia. DTP vaccines (Whole-cell), for instance, will cause fever (systemic reaction) in 50% of the people vaccinated. Management of the fever involves a sponge bath and adequate consumption of milk or water, while cold compression at the point of inoculation facilitates pain relief [13]. Administering of antipyretic and analgesic medication, however, should be under medical supervision. Excessive use of paracetamol or other antipyretics is to be avoided as the effects could be hazardous for vaccinated people, especially infants [13], in which liver cell is damaged, leading to liver failure and death [18]. Additionally, studies have found reduced immunization affected by the usage of paracetamol to prevent vaccine-induced fever [19,20]. Second, serious vaccine reactions are rare and tend to cause no long-term effects, including seizure, thrombocytopenia, and hypotonic hyporesponsive episode (HHE), which is a fatally severe allergic reaction [7]. These reactions tend to develop immediate symptoms, commonly 10 minutes after vaccine inoculation. Monitoring of side effects is thus mandatory, as the WHO recommends close monitoring for 20 minutes after inoculation [7]. In case of Thailand, the Vaccine-Preventable Diseases Division under the Department of Disease Control, Ministry of Public Health, recommends monitoring for symptoms within vaccination service sites at least for 30 minutes after inoculation [9]. Preparation of medication and emergency set for immediate life resuscitation is therefore necessary in this regard. Ultimately, consideration of restrictions regarding vaccines is fundamental in avoiding the adverse effects of vaccines.

Type 3) of AEFIs is immunization error-related reaction; including symptoms that emerged from using inappropriately stored vaccines, vaccination with the wrong technique or in the wrong spot, administration of vaccine in excessive volume, inappropriate storage of vaccine, and use of diluted vaccine with exceeded period of validity. Type 4), immunization anxiety-related reaction,

occurs from an individual response in the form of preconception towards vaccination, in which its symptoms are not associated with vaccine components. The symptoms, for instance, are dizziness, fainting, and blackout, which are common and unsevere, and found in children with more than 5 years of age. Lastly, Type 5), coincidental event could occur and, on some occasions, difficult to distinguish whether the event is vaccine-related e.g., immediate illness after vaccination. Vaccination thus should not be done on people with illness or fever [7].

From the AEFIs, correlated with infant which is a period of life dependent on others in every aspect, and also unable to clearly relay emotion and need [16,21], significant roles are thus bestowed upon parents, caregivers, or family to provide care and primary treatment to symptoms. These people could also facilitate in monitoring of abnormalities in need of care and provide immediate transfer for their infants or children to doctor. If parents and family are lack of knowledge, understanding, or are unable to conduct appropriate and immediate care, the life of infant and child could be prone to danger and damage. The subsequent effects also render parents or caregivers affected with stress, anxiety, and even economic impact of family i.e., a family member needs to stop working to care for children with undesirable, vaccine-induced symptoms [22]. Lack of confidence and knowledge, as well as possession of misbelief, could also cause parents or caregivers to refuse vaccination for their children [23,24]. To enable efficient disease prevention, vaccination needs to be conducted timely and completely. Premature vaccination yields no benefits, as a human body cannot proceed with proper immunization. Failure to receive complete and timely vaccination causes an inadequate level of immunization to sufficiently prevent diseases [4]. From these sets of information, it should be clear that parents or caregivers need to provide care for children; both in their infancy and other periods associated with vaccination. This includes health-related preparation, as well as knowledge and skills for appropriate and immediate intervention in case of undesirable events. In this regard, medical and health personnel, including nurses, should provide information and knowledge; assist in perception change, as well as conduct intervention training parents and caregivers, for correct and efficient care for children, particularly in their infancy.

From review of literature and research on parent and family intervention for infant care in relation to vaccination in international settings, a study on caregiver methods to conduct post-vaccination fever and pain prevention and management in the United States has been explored. Notably, the study found caregivers using antipyretic analgesics on children to prevent fever and pain. Among these, 11% of caregivers give the medication to children pre-inoculation, while 64% of them use the drug to relieve fever and pain within 48 hours post- inoculation [25]. Considering the context of Thailand, studies of this scope are rarely found. Information on the ways parents conduct pre-inoculation preparation, care during inoculation, and care post-inoculation particularly for undesirable events, is nearly non-existent. This pilot study, therefore, aims to explore the behavior of parents or caregivers on infants about vaccination care. The finding will be analyzed, contributing to the design of a family health education program to strengthen the capacity of parents and caregivers in the appropriate and safe practice of care for infants receiving a vaccination. This will facilitate infants to be properly vaccinated; efficiently protected against diseases, caring and monitoring for AEFIs effectively.

Objective

To study the practices of parents and caregivers for vaccinated infants at a Well Baby Clinic in Khon Kaen province, Thailand.

Method

This pilot study focuses on parents or caregivers, functioning as primary caregivers, who take 2–12- month-old infants to receive the vaccination at Well Baby Clinic of one hospital in Khon Kaen province. Ten people were selected using purposive sampling. Data collection employed interview form with the following questions: *how do you prepare before vaccination of infant*; *how do you provide care for your baby during vaccination*; *how do you provide care for your baby after vaccination*, and; *what topics do you review in the mom and baby health handbook*. Observation with record form was also done; observing practice and expression of parents or caregivers during and post-vaccination of their infants, as well as parental practice during observation period at Well Baby Clinic in March 2019. Data were subsequently analyzed using descriptive statistics and content analysis. The results were presented in the narration method.

Results

Regarding general information of parents, caregivers, and infants; 8 mothers, and 2 paternal grandmothers were found. Four mothers, 4 maternal grandmothers, and 2 paternal grandmothers were primary caregivers of the infants at home. Most of the infants; 5 of them aged 6 months, 3 infants aged 4 months, and 2 infants aged 9 months. The infants consisted of 6 males and 4 females. In terms of labor, 6 mothers conducted normal labor or vaginal delivery for childbirth. The other 4 mothers gave birth using cesarean section.

Pre-vaccination preparation practice

As data, analysis displayed that: Nine parents took the mom and baby health handbook (or pink book) before taking the infants to vaccination services. Eight parents did not check for vaccine details before going to the services; 4 parents who did not read the list of vaccines that their infants have to receive prior to going to the services; and all 10 parents did not study information on the vaccines needed to receive as scheduled.

Before going to vaccination services, all 10 parents conducted observations on the general health of the infants, particularly for fever, inactivity, or decrease in breastfeeding. They believed taking the infant to receive vaccine inoculation as appointed by a doctor or nurse is good and beneficial for their infants and perceived the efficacy of vaccines in disease and illness prevention.

Three parents had anxiety about the post-vaccination fever of their infants. Two parents gave antipyretic analgesics to infants' pre-

vaccination to prevent fever in advance. Seven parents thought vaccination is necessary and had no concerns. Moreover, 1 mother was found to take the infant to vaccination service 1 week before schedule and stated her unavailability on the actual appointed date.

Regarding previous experiences on vaccination, 9 parents were unable to recall the names of vaccines their infants received. Ten parents indicated the vaccines which their infants received were both inoculated and through oral methods. One parent could tell the name of vaccines but not their related diseases. Additionally, all of the parents noted no abnormal symptoms or illnesses were found in their infants at pre-vaccination.

In the aspect of knowledge and comprehension on vaccination during the appointed date, all 10 parents did not recognize and specify the vaccines and their associated diseases. They took infants to receive vaccination as appointments, which were conducted by doctors and nurses. They thought that vaccination was healthily appropriate and beneficial for the infants' health.

The practice of infant care during vaccination

Observation during vaccination revealed: 8 parents held their infants in inconvenient positions due to unfamiliarity; 2 caregivers (paternal and maternal grandmothers) did carry, adjust postures, and hold infants steadily due to precedent experiences; and 6 parents told their lack of experience and literacy on care for infants during vaccination.

Three mothers were found to look away and admitted the inability to look at infants during vaccination, while 2 mothers talked to infants with soothing voices. Three grandmothers, both paternal and maternal, talked to infants with the voice louder than crying, with words: *"quiet"; "it will just be a minute", and "good boy/girl*".

Two parents remained silent throughout vaccination of their infants, and all parents expressed no means of comfort, neither by touch, word, voice, making eye contact, nor distraction by speaking with a soothing voice, in which they noted to being "*worried, afraid the infant would be hurt, not knowing what to do, and the nurse would know what to do for the best*".

The practice of infant care after vaccination

Infant care post-vaccination, during observation at a Well Baby Clinic, revealed 2 paternal and maternal grandmothers carry and shake infants lightly to soothe their crying after vaccination. Two mothers carried their infants and walk around. Three paternal and maternal grandmothers attempted bottle-feeding infants in the hope to stop their crying. Three paternal and maternal grandmothers talked, calmed, and at the same time milk-fed the infants. One mother shook the toy to support her infant. One maternal grandmother used a smartphone to video call, allowing the infant and mother to look and talk together. One mother let the infant watch video on the smartphone. Lastly, one mother placed the infant on baby stroller and push it around to stop crying.

After vaccination, two maternal grandmothers administered antipyretic analgesic immediately upon arrival at home to prevent post-vaccination fever. One paternal grandmother bathed the infant immediately to prevent and relieve vaccine-induced fever. Four grandmothers, both paternal and maternal, did not bathe the infants for 1 day, believing that bathing could cause fever. Three paternal and maternal grandmothers applied herbal powder on the inoculation spot to prevent inflammation, noting its similar benefit in treating insect bites. Two maternal and paternal grandmothers used pain relief patches to reduce vaccine-induced pain. Lastly, 2 mothers massaged the inoculation spot to relieve pain.

Five infants were discovered with undesirable post-vaccination symptoms. Among these, 3 of them had high fever. Two paternal and maternal grandmothers thus administered paracetamol 3 times—morning, noon, and evening—as indicated on the label, in the hope to quickly relieve fever. These grandmothers did not conduct tepid bathing for infants, as they perceived it could cause the infants to increasingly cry, be uncomfortable, not consume milk, and be unable to rest. One mother provided care by soaking the infant in warm water mixed with limejuice to relieve fever. Two mothers cared for their infants by not disturbing them and letting them sleep. Two infants were found with redness at the inoculation spot, in which paternal and maternal grandmothers provided care by applying herbal cream, and subsequently massaged to relieve pain and redness. Lastly, one maternal grandmother provided a soaking washcloth in cold water and compress it on the inoculation area to relieve pain.

Seeking information on infant care in vaccination

Regarding consulting and inquiry for knowledge and information on vaccination and childcare, 7 people (mothers, paternal and maternal mothers) have preferred to make inquiries on vaccination with doctors and nurses at the vaccination services. The most interesting issues inquired and consult included period and ages in need of vaccination, vaccine types, and characteristics. Two mothers inquired about the characteristics and preventable diseases of the vaccines. Moreover, 2 mothers inquired about possible side effects and symptoms post-vaccination. Six mothers received information and suggestions on vaccinated infant care from their own mothers (grandmothers). The suggestions were derived from direct experience in raising own children. Two maternal grandmothers practiced care on infant, own grandchild, using mainly experience. In addition, two mothers noted neighbors provided the related information and suggestion.

Discussion

The results of this pilot study illustrate the practice of parents or caregivers on infant care before, during, and after vaccination, as well as seeking information and knowledge integral to the practice of infant care in relation to vaccination. The people caring for infants at home were mostly maternal and paternal grandmothers, accounting for 6 people. The people taking the infant to vaccination services, however, were mostly mothers, 8 people. This indicates the individual functioning as a major caregiver at home is not the

person taking the infant to vaccination services, reflecting the division of roles and responsibility within the family. A mother in contemporary Thailand needs to work outside to earn adequately for family. Maternal and paternal grandmothers, therefore, have taken the role of primary caregiver, a significant role supporting the family to function properly and comprehensively. Moreover, maternal and paternal grandmothers have relationships within the family system and are bound together according to the family genogram and attachment. This illustrates a form of the extended family commonly found in Thai society.

Additionally, the results of this study displayed inappropriate and/or inadequate practice regarding vaccination. Several parents and caregivers did not know the type of vaccine they took the infant to receive and the disease is prevented, for instance. Pre-vaccination care for infants observed the provision of antipyretic analgesic to prevent vaccine-induced pain and fever. Regarding care for an infant during vaccination, mothers and caregivers were found unable to care for, carry, or embrace infants steadily, but instead looked away, be unable to make eye contact, talk, soothe, or conduct other actions to distract the infants. The practice of care post- vaccination to prevent vaccine-induced symptoms involved application of herbal powder on the inoculation spot to prevent inflammation, abstinence of bathing for 1 day after vaccination due to the belief it could cause fever for infant, and feeding antipyretic analgesic immediately upon arriving home to prevent post-vaccination fever. This is in accordance with a study in the United States, which discovered caregivers used antipyretic analgesics to prevent fever and pain after vaccination [25].

To practice care in case of undesirable symptoms after vaccination, parents, and caregivers were found to administer antipyretic medicine, though without tepid sponging for infants. This was due to the belief that tepid sponging has a slower effect when compared to antipyretic medicine, and that it could cause infants to cry more and therefore be deprived of rest. This is consistent with a study by Piangpen Dechporn [26], which discovered the impact of infant fever on stress and the high anxiety of caregivers. Related procedures were thus done to quickly normalize the body temperature of infants, including administering antipyretic medicine according to own belief and understanding [27]. From this caveat, it is possible to find cases of excessive provision of paracetamol, which could cause danger and damage to liver cells, eventually leading to liver failure and death [18]. Furthermore, studies found no effect on pain prevention from consuming paracetamol pre-vaccination [28], with an impact on reducted immunization nevertheless [19]. To address and reduce fever condition, a soaking infant in warm water mixed with lime juice seemed to be a prevalent and traditional practice in some areas of Thailand. Application of herbal cream and massage on the inoculation area with pain and redness a similar method used to care for insect bites reflects the limitation of knowledge, belief, and practice among parents and caregivers to provide care for infants regarding vaccination. Lack of correct knowledge and information on infant care when receiving vaccination causes inappropriate care for infants, concern, and impact on decision-making regarding proper and appropriate care for infants receiving vaccination [22].

On exploration of information regarding vaccine and care for infants among parents and caregivers, some of them were found to inquire for information from family members and neighbors, who have provided care for infants receiving vaccination with methods according to traditional beliefs. On the other hand, a nurse is a source of information most inquired by parents and caregivers. Nurses, as health personnel, work most closely with infants and families. This is in line with a study in another country indicating parents or caregivers note health personnel as the most significant source of information [29]. Additionally, caregivers were found to inquire about the side effects of vaccines with doctors and nurses as well [30].

Accordingly, nurses have significant roles in assisting and implementing nursing capacity to develop family health behavior in infant care. This is also to prevent panic and misunderstanding among parents and families. Any nurse responsible for vaccination services should be able to provide correct information on possible post-vaccination symptoms of each vaccine both before and after the services [2,24]; positive and negative effects of vaccines; and practice of care to parents before the vaccination date. The information should be presented in clear and easily understandable manner, enabling both parents and caregivers to properly study and conduct decision-making on the care practice of their infants [3]. Additionally, nurses should seek to provide information and knowledge, facilitate perception change, as well as reinforce correct and appropriate care practice skills for families. This will allow parents and families to capably and timely prepare for their infants before receiving the vaccination, conduct care during vaccination and post-vaccination observation, as well as seek counseling from health personnel for effective and immediate care of their infants.

Conclusion and Suggestions

The correct and efficient practice of care for infants receiving vaccination among parents and caregivers is of high significance. It facilitates immunization against diseases and related, preventable illnesses, as well as safeguarding from side effects of vaccines. Parents and families need to ensure timely and comprehensive vaccination for infants, as well as observe for undesirable symptoms after vaccination and practice appropriate care. To realize these recommendations, nurses and related personnel responsible for vaccination and immunization should have a program to provide knowledge and skills on care practice of infants receiving vaccinations for family i.e., father, mother, and/or caregiver to forge the capacity necessary. Efficient and effective forms and methods on the provision of knowledge for parents and caregivers need to be developed or created, using primary data collected through surveys and evaluation of performance at actual operational sites. With these, relevant learning processes and media could be planned and developed, pioneering perception change and reinforcement of care practice skills of a family—particularly mother and caregiver. Consequently, correct and

effective preparation of, care during vaccination for, care and monitoring of symptoms for infants, as well as counseling with health personnel, could be done promptly, achieving the long-term goal of vaccination for infants.

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