

Parents' perception and understanding of Non-steroidal anti-inflammatory use in children with Chicken Pox infection and its associated risks

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Abstract

Background: Chicken pox is a common childhood infection. Children initially present with fever followed by a vesicular rash after 2 to 3 days. Nonsteroidal anti-inflammatory medications (NSAIDs) like Nurofen or Ibuprofen are commonly available over the counter antipyretic medications and are used initially in the management of fever by parents. The objective of this study and literature review is to gauge the knowledge and understanding of parents about using NSAIDs during chicken pox infection and the associated health risks.

Methods: The study aimed to conduct a qualitative cross-sectional survey by undertaking semi-structured interviews with open-ended questionnaire with 20 randomly selected parents whose children were diagnosed with chicken pox infection over a 3 month period, within the primary health care setting. The main objective was to find out if parents were aware of the associated risks of NSAIDs use.

Literature Review: A short literature review was conducted to gain further evidence about the use of NSAIDs medication in children diagnosed with chicken pox infection detailing the associated health risks and complications.

Results: Out of the total 20 parents interviewed; none were aware of NSAID associated risks during a chicken pox illness. 40% of parents (n=8) used both paracetamol as well as ibuprofen as the initial antipyretic medication whilst 60% of parents (n=12) used paracetamol alone.

Conclusion: There was a clear lack of understanding of the parents about the choice of antipyretic medication in the management of fever in chicken pox infection. None of the parents were aware of the associated risks of skin infection and necrotising fasciitis with NSAID use. Hence, there is need to develop parental educational programs to improve their understanding in the management of fever during chicken pox illness.

Key words: parent perception, chicken pox, NSAIDs

Introduction

According to the Centre of Disease Control and Prevention (CDC – 2019), chicken pox is a contagious disease. It is a viral disease caused by varicella-zoster virus (VZV). It leads to the development of itchy and blister-like rash. The rash generally appears over the chest, back of the body and face and then spreads throughout the body. The average incubation period of chicken pox post exposure from the virus is 2 to 3 weeks. Children, adolescents, pregnant women and young adults and people who are immune-compromised are vulnerable to getting infected with this painful viral infection. The best-way to prevent chicken pox is vaccination with chicken pox vaccine (1).

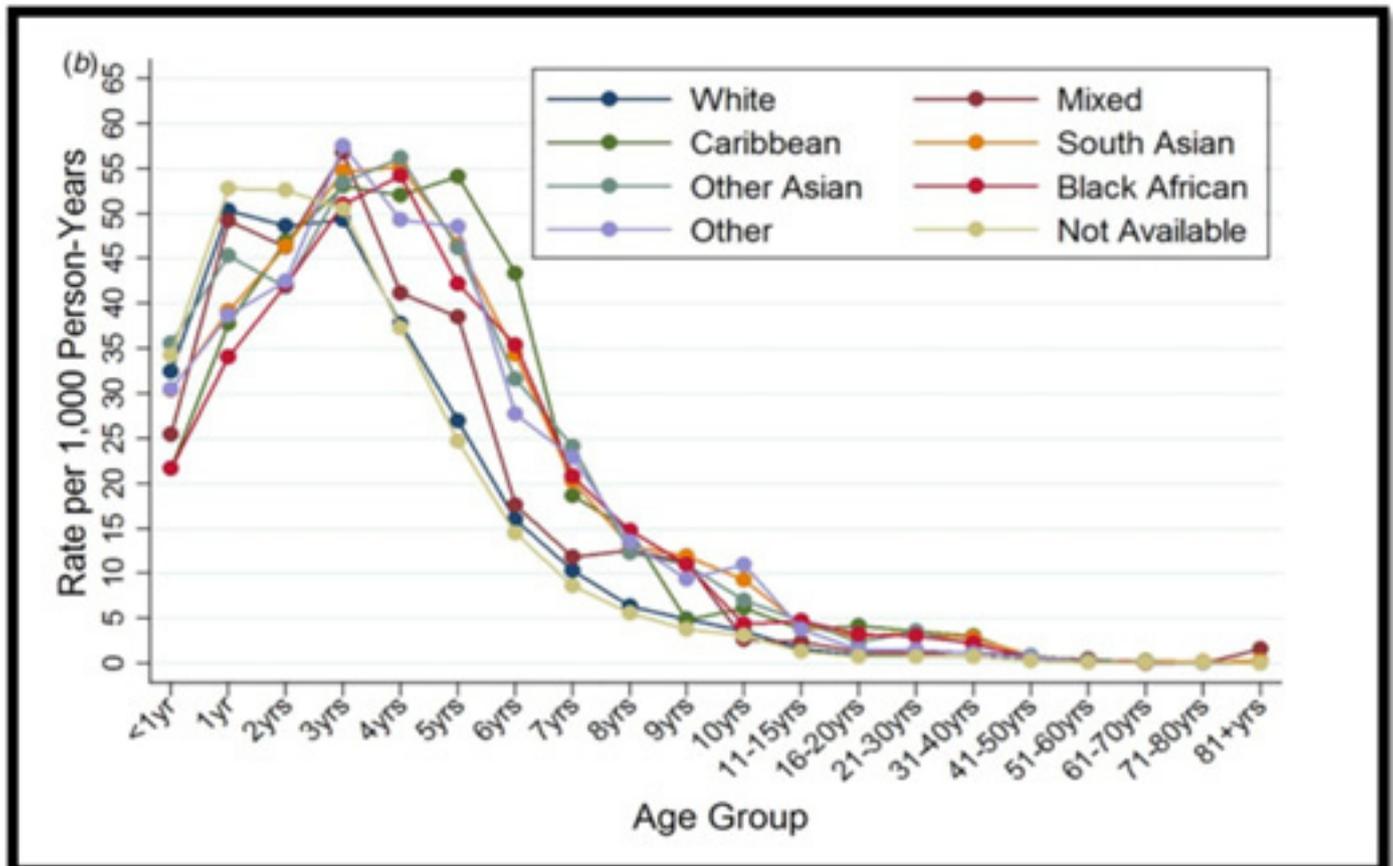
In the United Kingdom (UK), chicken pox is common during childhood. Approximately three-quarters of the parents report the history of chicken pox in their children who are below the age of 5 years (2). According to Walker et al. (2017), the age specific consultation rate of chicken pox among the various ethnic groups in UK highlights that the highest reported cases of chicken pox are below 6 years of age (Figure 1) (3). CDC reported that this highly contagious disease affects 80% of the population by age in the USA, Japan, UK and the main victims are below 10 years. In India and in South East Asia the conditions are different; the main victims include people between 20 to 30 years (1).

Boyd et al. (2017) reported although the mortality rate of chicken pox is low among children, the rate of incidence of chicken pox is high along with high morbidity in the USA and UK. UK encounters 25 deaths per year and the USA encounters 150 deaths per year (4).

Literature review and Evidence

The common practice among parents for the effective management of pain and fever arising due to chicken pox, is the administration of antipyretics such as Paracetamol and Ibuprofen. These analgesics are given during the early days of the disease as these two medications are two of the most common over the counter (OTC) medications available in the majority of countries (5). Neurofen and Ibuprofen belong to the same family of medicine collectively known as non-steroidal anti-inflammatory drugs (NSAIDs). A case-controlled study designed by Mikaeloff et al. (2008) on the population of UK primary healthcare service users for a period of 2 months, highlighted that use of NSAIDs in children during an active VZV infection leads to the development of cellulitis infection caused by *Staphylococcus* along with an increased risk of Necrotising Fasciitis (NF). However, the use of paracetamol did not show any significant health risk to the children in comparison to NSAIDs(6).

Figure 1: Taken from Walker et al (2017) - Consultation rate of Varicella in UK among various ethnic groups from 2006 to 2012 (3)



The study conducted by Mikaeloff et al. (2008) was supported by two other epidemiological studies; a cohort study conducted by Stone et al. (2018) (7) and a case control study conducted by Zerr et al. (1999) (8). All these studies showed the same trend. However, the study conducted by Mikaeloff et al. (2008) (6) is limited due to possible misclassification of patients as many patients might have taken over the counter NSAIDs without their GP's knowledge. Moreover, there was under reporting of complications possibly if patients ending up in hospital emergency instead of at general practice and were thus coded differently. Therefore, any results found by this study could possibly be considered as a lower bound estimate of the effect.

A case report was published in British Journal of Medicine (BMJ) in May 2018 describing a 4-year-old girl who presented to the emergency department after three days into her chicken pox illness with a rapidly progressive Necrotising Fasciitis (NF) requiring antibiotics and surgical debridement followed by a skin graft and a prolonged hospital stay. She had received two doses of Ibuprofen in the community prior to her presentation. This case report also emphasised caution about not using NSAIDs at all or using them cautiously in primary varicella infection as they have been associated with development of Necrotising Fasciitis (NF) (9).

So, what does all this mean for the parents? If a child has chicken pox and is given Ibuprofen or another NSAID, there is a risk of developing certain complications. Thus Mikaeloff et al. (2008) (6) stated that it would be better to treat them only when their fever is making them uncomfortable or upset by administering paracetamol. However, there is a gap in parent perception and understanding about the management of fever and pain symptoms of chicken pox. A cross-sectional survey conducted by Cohee

et al. (2010) over 487 parents who had their children enrolled at two different urban based paediatric clinics in Baltimore, Maryland highlighted the need for improving the understanding and education of parents about perception and management of fever. It showed that African American parents mainly have difficulty with appropriate dosing of antipyretics while Caucasian and Latino parents experience difficulties in discriminating between normal temperature and fever temperature, thus showing "fever phobia". Interestingly, regardless of the ethnicity, most parents treat temperatures in the normal range with medicines and also dose antipyretics more frequently (Figure 2)(10).

However, the cross-sectional survey by Cohee et al. (2010) demonstrated a few limitations including the confusion created between temperature calculation method between Celsius and Fahrenheit by parents, likely creating misinterpretation and poor understanding of normal temperature range, creating "fever phobia" as mentioned. Also, the Latino group was least to use age appropriate method of checking temperatures i.e rectally ≤ 3 years age and orally ≥ 3 years of age. Only half of parents could identify temperature in fever range and treat appropriately. On a positive note, the survey demonstrated the necessity of improving education of families about proper fever management and the correct dosing of antipyretics (10).

Walsh et al. (2007) conducted a qualitative semi-structured interview with fifteen metropolitan parents in Queensland Australia. The aim of the study was to identify the influences on parents' fever management, beliefs and experiences. The results were very interesting and showed antipyretics were the first line of treatment by many parents irrespective of the temperature. Some preferred specific antipyretics like Ibuprofen as first choice and some showed overdosing as well when using in combination with other antipyretics. Parents' management of fever and practices were

Figure 2: Taken from Cohee et al (2010) - Ethnic differences in parental perceptions and management of fever (10)

	Caucasian	African American	Latino
Temperature knowledge	↓	↓	↓↓
Worry about fever	↑	↑	↑↑
Believe fever causes harm	↑↑	↑	↑↑↑
Awaken children to treat fever	↑↑	↑↑↑	↑↑
Alternate acetaminophen and ibuprofen	↑	↑	↓
Dose acetaminophen too frequently	↑	↑	↑
Dose ibuprofen too frequently	↑↑	↑↑↑	↑↑

greatly influenced by their beliefs, knowledge, source of information, and number of children in the family. Although this study achieved its target of finding the objectives and important influences were identified, the limitations were, it was not generalised, the parents who participated were well educated and were from metropolitan areas. So, a more generalised study with bigger sample size is required to confirm these findings (11).

Materials and methods

1 Study Design:

A cross-sectional study was carried out in a primary health care setting in Doha, Qatar. Data collection was done over a period of 12 weeks from June 2019 to September 2019. The idea was to assess the level of perception of parents of use of antipyretics especially neurofen and Ibuprofen (NSAIDs) in chickenpox infection and if the parents were aware of associated risks of use of NSAIDs during a chickenpox infection.

2 Study Population:

A total number of 20 parents were randomly selected who presented with their children, having a confirmed diagnosis of chicken pox infection, either made in primary care or in an emergency department. All children were between the age range of 5 to 15 years. This included parents who presented for the first time with a child having chicken pox and also those who have had other children with chicken pox. According to Faber and Fonseca (2014), 20 is a poor sample size. A large sample size helps to gain generalisability of the data and helps to detect clinically relevant differences. Using a small sample size increases the chance of assuming true as a false premise (12). Thus, selection of a small sample size of 20 can be considered as one of the limitations of this study, however, small sample size was selected taking into consideration the timespan and local population for which the study was conducted.

3 Study Instrument:

Data collection was done by conducting semi-structured interviews with open-ended questionnaires to judge the level of understanding and perception of parents. The questions in general focused on the most commonly used OTC antipyretic medicine by parents in order to manage the symptoms of fever, if they preferred NSAIDs or Paracetamol in fever management, if they used NSAIDs during chicken pox and if they were aware of any associated risks of using NSAIDs in chicken pox.

Semi-structured interviews enabled the researchers to encourage conversations with the interviewee and thereby giving participants the flexibility to elaborate on the given information and why they thought that information was relevant to the research (13). Also, semi-structured interviews help the researchers to enjoy freedom to navigate during the conducting of the interviews and thus allowing the participants to lead the interview towards the direction of their own interests and respective personal constructs (14).

4 Ethical Considerations:

Researchers obtained ethical approval from those in charge of respective health centers as per local policy.

Results

The study involved total 20 parents, out of whom 14 presented for the first time with a child having chicken pox. The remaining 6 parents had other children diagnosed with chicken pox before (Figure 3). Out of the total of 20, 8 parents had a single child and 12 were had multiple children at home. All children who attended with chicken pox during the study were between age range of 5 to 15 years with the mean age of 8.7 years. Interestingly, none (0%) of the 20 parents were aware of any potential risks of NSAIDs use during chicken pox illness, including those 6 parents who had prior experience of managing other children at home with chicken pox. Out of the 20 parents, 8 parents (40%) used both Paracetamol and Ibuprofen for the initial management of fever, while the remaining 12 (60%) used only paracetamol as an antipyretic, but none (0%) were aware of the need to avoid NSAIDs in chicken pox infection and its associated risks.

Figure 3: Graph showing comparison of parents with first experience with chicken pox vs parents with previous experience of chicken pox with other child

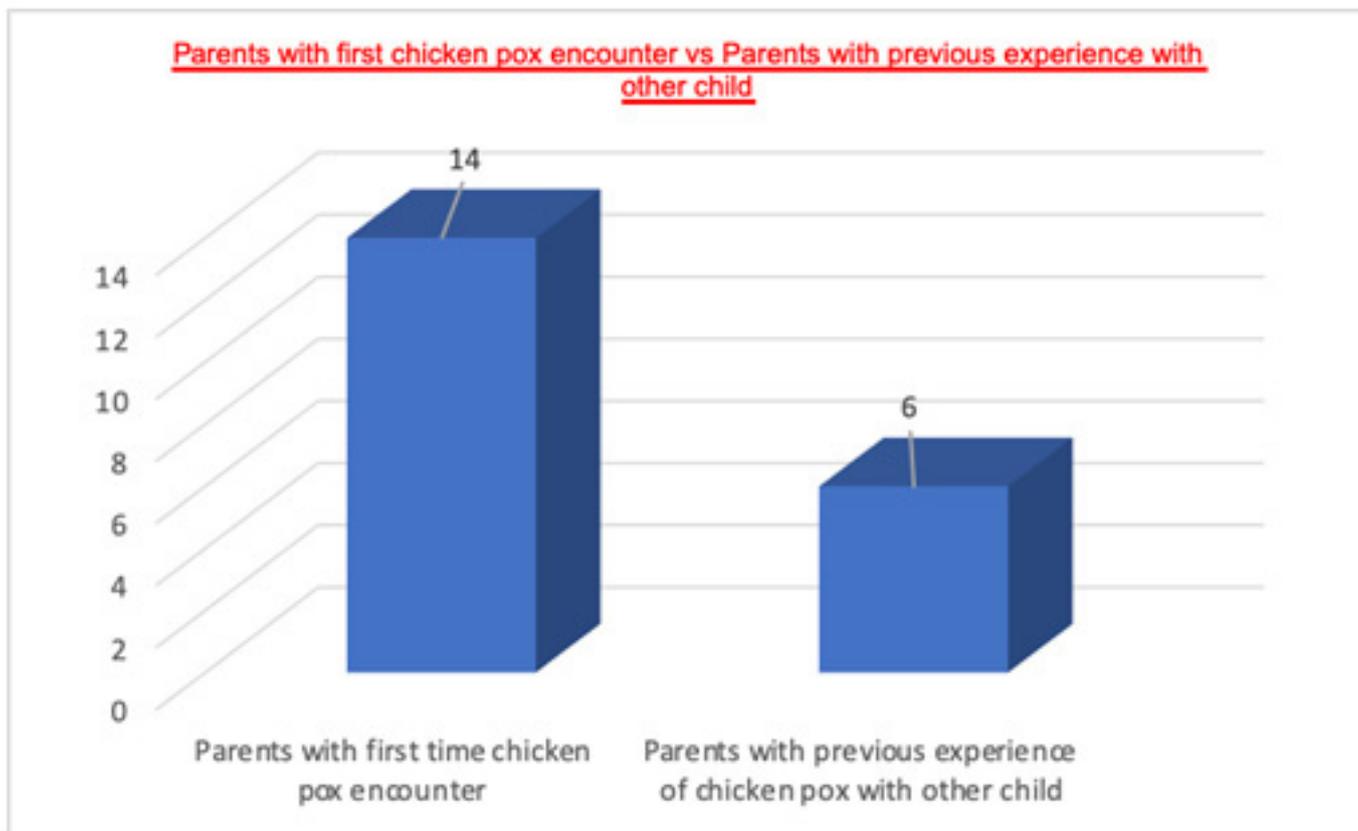
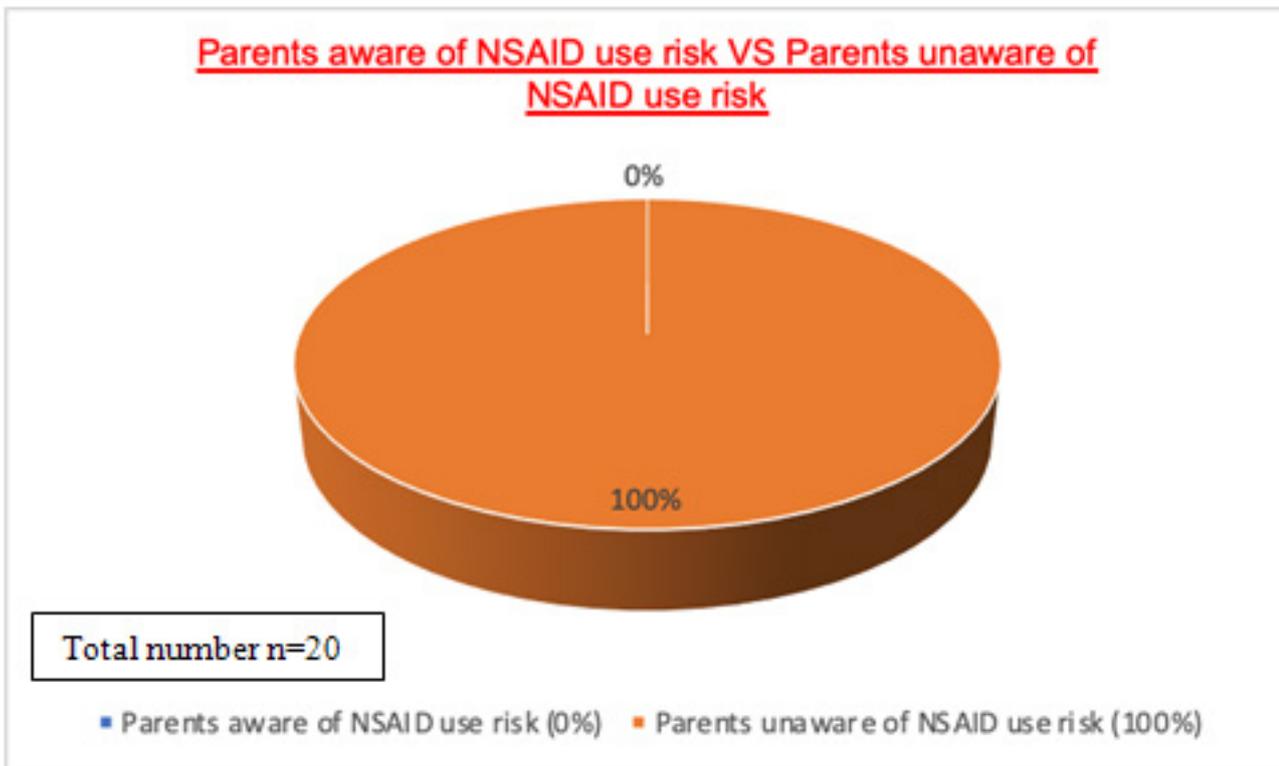


Figure 4: Graph showing comparison of parents aware of NSAID use risk during chicken pox illness VS parents unaware of NSAID use risk



Conclusion

In light of the detailed relevant literature review, it is quite evident that use of Neurofen or any other NSAIDs in children with chicken pox infection increases the risk of skin infections including Necrotising Fasciitis and secondary bacterial infections. Also, the conducted study elaborates poor understanding of parents about use of NSAIDs during chicken pox illness. Thus, overall it can be said that the clear understanding of the parental perception about the management of fever in chicken pox with medication and other interventions is lacking. Parents in general should be made more aware to use Paracetamol as the initial choice of antipyretic medication for any febrile illness as in the initial 2-3 days it is not evident that febrile illness is due to chicken pox or any other cause. Also, once the clinical diagnosis of chicken pox is confirmed, NSAIDs should be completely avoided. There should be more health education about use of OTC antipyretics and their consequences. The health education can be provided either by direct face to face doctor patient encounters, through pharmacies when parents buy OTC medications or through patient information leaflets.

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