INFLUENCING FACTORS IN MMR IMMUNISATION DECISION MAKING

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Abstract:
Immunisation of children is not a straightforward process for parents.
The United Kingdom [UK] has a structured immunisation programme which continues to evolve and develop in meeting the demand to improve and control preventable infectious diseases.
Following a measles outbreak in Quebec, Canada in 1989 it was suggested that a single Measles, Mumps and Rubella [MMR] vaccine did not provide enough seroprotection to ensure herd immunity levels of 95%. Therefore the UK introduced a second dose of the vaccine in 1996.
Factors influencing parental decision making in relation to uptake of the MMR vaccine are the prevention of disease, the consequences of contracting infectious diseases, perceived pain and the media.
Practice Nurses are a credible source of information that parents actively seek to inform their decision making in relation to the immunisation of their children.
Immunisation decision making is not a straightforward process for parents. Many factors influence parental decision making on whether they immunise their child with the Measles, Mumps and Rubella [MMR] vaccine. The feasibility study described in this article provides insight into influencing factors associated with decisions regarding the immunisation of children by parents. The study findings suggest the practice nurse is a credible source of information parents actively seek to inform decision making. At a time when the incidence of measles and mumps is rising in the United Kingdom [UK] the provision of appropriate information by the Practice Nurse has the potential to increase uptake of the MMR vaccine.

Key Words: MMR Vaccine, Immunisation, Influencing Factors, Practice Nurses, Decision Making

Introduction

Immunisation is a proven tool for controlling and eliminating life-threatening infectious diseases. It is estimated to avert between 2 and 3 million deaths worldwide annually (World Health Organisation [WHO], 2010a). After clean water, immunisation is the most effective public health intervention in the world for saving lives and promoting good health (Health Protection Agency [HPA], 2010a). The WHO credits immunisation as one of the most cost-effective health investments in the world today (WHO, 2010b).

This article presents insight into influencing factors associated with decisions regarding the immunisation of children by parents. It begins by providing an account of the background to the resurgence of measles and mumps in the UK and the role of health professionals involved in the administration of the MMR vaccine. This article describes the perspective of five parents whose children have been immunised with the MMR vaccine. In particular, it explicates the rationale, aims, design, methodology, results and discussion associated with a feasibility study which provides the foundation for a larger study that will discern influencing factors in parental decision making associated with the MMR vaccine.

Resurgence of Measles and Mumps

The UK has a structured childhood immunisation programme, which continues to evolve and develop in meeting the demand to improve and control preventable infectious disease (Salisbury et al,

2006). The overall aim of the childhood immunisation programme is to protect all children against the preventable diseases of: diphtheria, pertussis, tetanus, polio, haemophillus influenzae type b, meningococcal serogroup C, measles, mumps, rubella and pneumococcus (Salisbury et al, 2006). Many of these vaccines are combined vaccines. One of these combination vaccines is the MMR vaccine, which is recommended to be administered at 13 months and again at approximately 4 years of age (Salisbury et al, 2006). The success of any immunisation programme, such as the childhood immunisation programme, is dependent on meeting 'herd immunity' levels to prevent local outbreaks and epidemics of the diseases it is targeting. Therefore, it is crucial that the uptake of vaccines such as the MMR vaccine meets the recommended herd immunity level of 95% of the targeted population in order to prevent disease outbreaks of measles, mumps and rubella (Salisbury et al, 2006).

Measles has been a notifiable disease in England and Wales since 1940 (Salisbury et al, 2006; Asaria and MacMahon, 2006; Kassianos, 2001). A single monovalent measles vaccine was introduced into the childhood immunisation programme in the UK in 1968 (Salisbury et al, 2006). However, due to low uptake of the vaccine an interruption of measles transmission over the next 20 years was not possible. Subsequently there were between 50,000 and 100,000 notifications annually (Salisbury et al, 2006). In an attempt to increase uptake of the measles vaccination, the trivalent MMR vaccine was introduced in October 1988 to replace the measles vaccine (Salisbury et al, 2006) and to reduce mortality rates (Jansen et al, 2003; Miller 1985). Following a measles outbreak in Quebec, Canada in 1989, it was suggested that a single MMR vaccine did not provide enough seroprotection to ensure herd immunity levels of 95% (Salisbury et al, 2006; Kassianos, 2001). Effectiveness of a two dose schedule has been demonstrated in Finland and the United States of America [USA] (Salisbury et al, 2006). Therefore, a second dose of the vaccine was added to the UK childhood immunisation programme schedule in October 1996 (Salisbury et al, 2006). Initially, the addition of a second MMR vaccine demonstrated a reduction in outbreaks of measles and rubella from 1996 - 1998 (HPA, 2011a). Despite the reduction in the incidences of measles and rubella, notifications of mumps continued to rise during this timescale with 94 confirmed cases of mumps in 1996 to 121 cases in 1998 (HPA, 2011b). In 1998, Wakefield et al published a paper in *The Lancet* regarding side effects of the MMR vaccine. Reaction by the public to the article was much like the response of the public to the pertussis vaccine. There was considerable professional and public anxiety regarding the safety and efficacy of the pertussis vaccine. Subsequently, major epidemics of pertussis occurred in 1977 – 1979 and again in 1981 – 1983 with over 68,000 notifications and 14 deaths (Salisbury et al, 2006; Baker, 2003). Similar to the reactions to the pertussis vaccine, the publicity generated by the Wakefield article led to scepticism amongst parents about the safety of the MMR vaccine and its alleged association between the vaccine, autism and Crohn's Disease (Yarwood et al, 2005). Consequently, this concern manifested itself in a decrease in the uptake of MMR vaccinations in the UK from 95% in 1993 (Kaye et al, 2001) to 80% in 2003-2004 (NICE, 2010). The decrease is despite a retraction by the majority of the researchers in an article published in *The Lancet* refuting an association of any of the syndromes described in the original study (Murch et al, 2004). Not surprisingly, the decline in vaccination rates of MMR has led to a resurgence of measles and mumps in particular. In 1998, the confirmed cases of the diseases were: measles n = 42 (HPA, 2010b); mumps n = 67 (HPA, 2010c) and rubella n = 28 (HPA, 2010d). The HPA's data for confirmed cases of these diseases in 2009 was: measles n = 876 (HPA, 2012a); mumps n = 5695 (HPA, 2012b) and rubella n = 9 (HPA, 2012c). The increases in the infectious diseases of measles and mumps notably, is despite widespread campaigns to promote the vaccine (Lamden and Gemmell, 2008) and the evidence on the vaccine's safety and effectiveness (Taylor et al, 1999; Farrington et al, 2001; Dales et al, 2001; Kaye et al, 2001; Madsen et al, 2002; Taylor et al, 2002; Madsen and Vertergaard, 2004; Honda et al, 2005).

Health Professionals Involvement in the Administration of the MMR Vaccine

Several factors have been cited in the literature that influences immunisation decision making. These have been grouped as themes that have emerged from the literature (Table 1). One of these factors is the relationship with health professionals. Research supports the influence of the General Practitioner and Health Visitor on parental immunisation decision making relating to the MMR vaccine (Harrington et al, 2000; Petrovic et al, 2001; Evans et al, 2001; Smailbegovic et al, 2003 and McMurray et al, 2004). However, this literature is silent in relation to the Practice Nurse who is the principal health professional involved in the administration of the childhood immunisation

programme (Maconachie and Lewendon, 2004).

Table 1 Immunisation Factors Influencing Parental Decision Making

- Immunisation history (Austin et al, 2008)
- Location and access to services (Harrington et al, 2000; Wilson, 2000; MacDonald et al, 2004; Lamden and Gemmell, 2008)
- Relationships with health professionals (Harrington et al, 2000; Evans et al, 2001; MacDonald et al, 2004; McMurray et al, 2004; McGreevey, 2005; Mixer et al, 2007)
- Perception of information sources (Kai, 1996; Evans et al, 2001; Smailbegovic et al, 2003, Gellatly et al, 2005; McGreevy, 2005; Casiday et al, 2006; Hilton et al, 2007; Hackett, 2008)
- Risks associated with the vaccine (Smailbegovic et al, 2003; Gellatly et al, 2005; Austin et al, 2008)
- □ Social Class and Ethnicity (Impicciatore et al, 2000; MacDonald et al, 2004; Friederichs et al 2006; Mixer et al, 2007; Austin et al, 2008; Lamden and Gemmell, 2008).

The principal aim of this feasibility study described in this article has been to ascertain influencing factors on parental immunisation decision making. This study has sought to:

i) Explore the factors that influence parental decision making on whether to immunise their child with the MMR vaccine

ii) Ascertain who the parent seeks information from to influence their immunisation decision making on the MMR vaccine.

Design

The research design developed for this pilot study was descriptive first level exploratory research employing a Modified Grounded Theory method for data analysis and synthesis as described by Burnard (1991). It was determined, following a literature review of the subject on parental decision making associated with immunisation of their children with the MMR vaccine, that a small scale feasibility study should be undertaken prior to initiating a large scale study. Findings from the study could provide rationale for a more substantive study.

Sample

The sample was drawn from five parents of varying socioeconomic backgrounds and education (Table 2) whose children had received their MMR vaccine. The first author approached three general practices in London to participate in the study. All agreed to be involved. Each general practice was based in a different National Health Service [NHS] Trust. There were specific inclusion and exclusion criteria for this study. All parents had to be fluent in the English language; have had their child immunised within the previous 12 months; be registered in one of the general practices agreeing to take part in the research and be aged between 18 - 45 years of age. Only parents who had parental responsibility were recruited, which Griffith (2008) defined as enabling an individual to make decisions in a child's life, which would include consenting on behalf of a child for medical treatment. Four (80%) were female and one (20%) male. The mean age of participants was 32 years. The use of pseudonyms was deemed appropriate to protect the identity of all participants. The ethnic backgrounds of the parents were not homogenous. Demographics of the participants are shown in Table 2.

Table 2 Participant Demographics

Participants	Ethnicity	Socio-economic Group* * The National Statistics Socio-economic Classification	Gender	Education	Number of children and ages of children
Jo	Ghanaian	L 14 (Unemployed	Female	Secondary education	3. 18 months, 4

		for more than one year)		until 16 years.	years and 6 years
Sharon	British White	7 L13 (Sales Assistant)	Female	Secondary education until 15 years.	1. 18 months.
Ulrika	Turkish	2 (Mathematician)	Female	University graduate	1. 14 months.
Cheryl	British Black	L 15 (Full time student)	Female	University graduate	1. 18 months.
Mark	British White	2 (Accountant)	Male	University graduate	2. 18 months.

Methodology

A Modified Grounded Theory (Burnard, 1991) approach was employed in this feasibility study. An exact sample size is difficult to estimate at the beginning of a Grounded Theory project because this can only be determined at the time of theoretical saturation. Theoretical saturation means no new data can add to the emerging theory; thus all avenues of exploration have been exhausted. Theoretical saturation may occur in as little as three or four interviews or as many as twenty to thirty (Creswell, 1998; Morse, 2000). In modified Grounded Theory methodology small samples are employed. The sample size (n = 5) was therefore, considered appropriate for a feasibility study (van Teijlingen and Hundley, 2001).

Data were gathered through semi-structured interviews conducted by the first author, who obtained written consent from each participant prior to undertaking interviews. Ethical approval to undertake the study was granted by the Research Ethics Committee (REC) on 23/06/2010. REC reference number: 10/HO703/24. All five interviews occurred in July 2010 in three different general practices in East London. The interviews were digitally recorded and transcribed by the first author. Each interview was conducted face-to-face and lasted between 30 - 40 minutes. The first author asked each of the participants the same questions, which are shown in Table 3 to strive for consistency in the questions posed and to minimise the potential for bias that asking participants different questions could cause.

Table 3 List of questions

- What has influenced your decision to immunise your child with the Measles, Mumps and Rubella (MMR) vaccine?
- Who has influenced this decision?
- Which health professional do you consult for immunisation advice and queries?
- Why do you consult this health professional for immunisation advice?
- Can you explain if this health professional has influenced your decision on whether to vaccinate your child with the MMR vaccine?
- If you had a question about the MMR vaccine, who would you discuss this with and why?
- Did you ask the Practice Nurse (PN) about the MMR vaccine? Did this influence your decision on immunizing your child with the MMR vaccine?
- If you did not ask the PN information about the MMR vaccine, why did you not approach the PN for information?

Results and Discussion

Three themes were synthesised from the data. These are shown in Table 4.

Table 4 Emergent Themes from Synthesised Data

• Factors influencing immunisation decision making • Sources of information • Professional role and status

Factors influencing immunisation decision making

The MMR controversy has generated considerable academic interest. A number of studies have used surveys, interviews and focus groups to investigate parents' attitudes to, and decisions about, the vaccine (Pareek and Pattison, 2000; Evans et al., 2001; Petts and Niemeyer, 2004; Poltorak et al, 2005; Casiday et al, 2006; Hilton et al, 2007). These studies have generated broadly consistent insights into parental decision making about the MMR vaccine, which has been shown to be influenced by various factors (Skea et al, 2008). In support of these findings, participants in this study listed a range of factors that influenced their decision making. These are shown in Table 5. Interestingly, these findings have been supported in previous research (Evans et al, 2001; Hilton et al, 2007).

Table 5 Factors Influencing Immunisation Decision Making

The prevention of disease
The consequences of contracting infectious diseases
Perceived pain
The media.

Participants also identified pain as a primary factor influencing their decision as to the number of vaccines their children should receive.

"The fact of nine injections to put my son through. Nine injections, she [practice nurse] made that very clear to me... and that was also a big influence. Am I going to put my child through nine injections and put myself through nine injections?" (Ulrika)

"Why let him endure the pain of having three separate injections, when he can have the one altogether and get it over and done with?" (Cheryl)

This finding reflects the findings published in the UK and Ireland highlighting parental distress and concern associated with the administration of childhood vaccines (Harrington et al, 2000; Meyerhoff et al, 2001; Bedford and Lansley, 2007). A cross sectional survey by Bedford and Lansley (2007) revealed that the majority of parents (n = 98/105) considered it less distressing for their child to have fewer injections, as revealed by two of the mothers interviewed in this feasibility study. Likewise, survey results (n = 294/296) revealed that parents had strong preferences for limiting the number of injections at one visit in order to minimise their distress at their children receiving multiple injections (Meyerhoff et al, 2001). In addition, Harrington et al's (2000) in depth interviews of 23 mothers found that many of the mothers interviewed experienced severe emotional distress at the prospect of inflicting the pain of immunisation on their infants. However, in this qualitative study, mothers acknowledged that they perceived the pain being inflicted on their infant as short lived.

As noted in Table 5, the media were cited as an influence on parental decision making:

"It was around the time, that there was the news and the media attention around the fact that Tony Blair's children were going to have the vaccines separately... Because in your mind you think, what's good enough for Tony Blair's son is good enough for my child." (Cheryl)

This participant's experience reveals how this media report made her consider separate vaccines for her son. While this participant did consider the possibility of separate vaccines, the media did not influence her final decision to immunise her son with the trivalent MMR vaccine. Literature has shown that it has been more common for parents to view the media negatively (Hackett, 2008; Hilton, 2007). Trust in the media has been reduced subsequent to sensational headlines leading many parents to view journalists as scaremongers (Hackett, 2008).

The majority of participants rated the importance of the practice nurse in either informing or influencing their decision making.

"Yes...when I come for the immunisation, she [practice nurse] will always tell me how important it is." (Jo.

"I did speak to ... [Practice Nurse]. That's one of the nurses' here. She has informed my decision." (Cheryl)

"Well, I can just say, straight away that there is no other health professional that has given us any talk, other than the practice nurse. She's the one we have only spoken to about it. I didn't think about anyone else." (Mark)

Mark identified a factor that was discrete from other parents' immunisation influencers namely, the effect of vaccine preventable infectious disease. Mark's twin daughters were born with congenital bilateral deafness and attended their local audiology clinic. Some of the children who attended the audiology clinic had acquired deafness due to contracting vaccine preventable diseases such as measles and mumps, which were part of the childhood immunisation programme:

"...You sit around together and each person talks about their child and how they got deafness. I was shocked! None of them have had any of the jabs whatsoever! And all wish they had now. So, if anyone is in any doubt about having these jabs, go and speak to these people. See the horrible results and consequences!" (Mark)

Experiencing an infectious disease such as measles or observing the negative impact of this disease in terms of morbidity and mortality was a strong motivator for parents of completely immunised children (McMurray et al, 2004). Likewise, because of Mark's experience, he was a strong advocate of immunisation.

A factor not identified by parents in previous research on influences to their immunisation decision making was the incidence of measles. This pilot suggests how local outbreaks of measles influenced some parents to immunise their child with the MMR vaccine.

"A couple of years ago, you know, there was an outbreak of measles. People weren't having their kids immunised. I just think it is best to have all their immunisations, rather than just leave it." (Sharon)

"Measles has been quite common in the area lately. So, I thought that rather than me posing the risk of him being able to catch it, I'd rather protect him". (Cheryl)

"The practice nurse was a bit concerned about the poor take up of vaccinations around here. I think it's an epidemic waiting to happen around here. 100%. I think I looked it up and it was 52% take up around here. It was horrendous! So obviously that influenced our decision even more." (Mark)

These parents were aware of local incidences of measles, which helped galvanise their resolve to immunise their children with the MMR vaccine. With the increasing incidence of measles and mumps, practice nurses are key to ensuring that parents are informed about local outbreaks of vaccine preventable diseases and the consequences of not immunising their children.

Sources of information

This theme relates to where participants accessed information and/or how they rated this information. Whilst health professionals have been identified as valuable sources of information (Smailbegovic et al, 2003), this study suggests that the practice nurse is rated as a source of information that participants rely on and actively consult for information advice. None of the participants commented that the information provided by the practice nurse was biased, which has been a finding relating to other health professionals (Evans et al, 2001; Petrovic et al, 2001; Smailbegovic et al, 2003). This finding suggests that the group of practice nurses who were consulted by the participants in this study were unlike the health professionals identified in earlier research as being "unable to give impartial advice" (Casiday et al, 2006: 183).

It is suggested from the findings that participants did not rely on a single source of information. Many relied on multiple sources, such as NHS websites; family members; Parent Fora; health professionals and NHS leaflets. This is a finding supported in previous research (Smailbegovic et al, 2003; Daniels 2002). Some participants commented on the helpfulness of leaflets which informed their decision making. This finding has been supported by findings from the research of Casiday et al (2006) and Gellatly et al (2005).

"I asked the nurse... and I went home and I asked my sister, who is a doctor (general practitioner) ... and they (general practitioners) are my first point and if they are busy then it is the nurse and she would provide me with the information that I need. I also use the internet." (Ulrika)

"I mean the Red Book contains a hell of a lot of information. I have had a lot of time sitting around the hospital for eight weeks and I have read the thing front to back... and also having a quick look on the NHS sites... Wikipedia. I did want to have a look at what the risks were, which is obviously what I had seen in the articles." (Mark)

"It would have been reading the NHS website, probably, I think. That would have been number one. Number two would have been the nurse. Number three, not the nurse or the doctor. Number three would have been the health visitor." (Cheryl)

The narrative of these participants suggests the various sources of information accessed to reach their decision. It suggests that parents seek out the practice nurse as a source of information, which can assist in influencing their decision making.

Professional role and status

Analysis of the narratives revealed how all participants identified professional roles and status of health professionals within the primary care setting. Parents attributed varying levels of knowledge to health professionals such as the general practitioner and practice nurse. An association with greater knowledge was linked to professional status.

"More enlightened...I think, because he is a doctor: he has studied." (Jo)

"A nurse is a nurse, but a doctor is a doctor...I don't know, you just feel more safe. He is a doctor." (Sharon)

Cheryl identified the practice nurse as the most important health professional when seeking immunisation advice and related this to the experience that the practice nurse had in dealing with immunisation matters.

"With kids and vaccinations, it is probably the nurse because they give the vaccinations in the practice. The doctor doesn't do that… It does make the nurse more important for me." (Cheryl)

Considering that one of the many roles that the practice nurse undertakes in general practice is administering the childhood immunisation programme (Crawford, 1997; Yarwood and Bozoky, 1998; Hampson 2002; Maconachie and Lewendon, 2004; Drennan and Goodman 2007) and who additionally has been identified as the principal immuniser in some areas (Maconachie and Lewendon, 2004), this was not a surprising finding.

The majority of participants in this study consulted with the practice nurse. However, Sharon didn't and questioned why she would need to consult with the practice nurse.

"I have never been to see the practice nurse. So I just don't feel why in what way I would want to go and speak to the nurse." (Sharon)

This statement may suggest that Sharon was unaware of the role and the services provided by a practice nurse.

Conversely the advice of the general practitioner and practice nurse were actively sought and valued by other participants as evidenced by:.

"It is mainly the general practitioner. And they are my first point and if they are busy then it is the nurse. And she would provide me with the information that I need. Because I trust them; because I know what they are doing and I can ask them anything. And they will give me the honest answer. And that is what I am after." (Ulrika)

"A couple of times we have been to .... and that is a complete nightmare!....Getting in the car shooting off, whereas here you can just walk over. It is so much more relaxed. She [Practice Nurse] has told us as much as possible. This has saved a lot of hassle for us." (Mark)

Previous research reflects how health professionals (i.e. the general practitioner and the health visitor) have been perceived as trustworthy and how this has been a factor influencing immunisation decision making (Hackett, 2008; Mixer et al, 2007; McMurray et al, 2004; Daniels, 2002). Lack of a trusting relationship with health professionals has been shown to have an adverse effect on immunisation decision making (Austin et al, 2008). It has been interesting to find that in this study, the Health Visitor has not been identified as an influencing factor in decision making. This study's findings reflect the trusting relationship that Ulrika had with her general practitioner and practice nurse and how this guided her decision making. Related to trustworthiness was parental confidence in the ability of the general practitioner and practice nurse to answer queries concerning immunisation. A trusting relationship with a health professional has been cited as having a positive influence on parents immunisation decision making (Mixer et al, 2007). Therefore, the trusting relationship that these participants have with their practice nurses can be viewed as facilitating

decision making regarding childhood immunisation.

Mark chose to consult with the practice nurse because of easier access to immunisation services and because the practice nurse provided the information he needed to make an informed decision regarding the immunisation of his children. The input of the practice nurse as a sought after source of information on immunisation matters and the practice nurse's ability to be attuned to parental concerns both assists and informs parents in terms of influencing parental immunisation decision making.

Limitations

The sample size (n = 5) in this feasibility study may be considered insufficient to achieve saturation. Notwithstanding, it is evident from the participants narrative that the practice nurse plays a significant role in relation to influencing parental decision making associated with uptake of the MMR vaccine. Research has shown that theoretical saturation may occur in as little as three or four interviews or as many as twenty to thirty (Creswell, 1998; Morse, 2000) and for a feasibility study is appropriate (van Teijlingen and Hundley, (2001),

The sample did not include participants whose first language was not English; principally due to the additional cost of using interpreters. This may have elicited different viewpoints to those identified by the five participants, who had fluency in English. Further research will involve participants whose first language is not English and who will require the use of an interpreter to discern their views on factors that influence parental immunisation decision making.

Conclusion

This study has identified a new factor that influence parents' decision making, which have not been determined from previous research. This factor concerns risks associated with local incidences of infectious diseases such as measles from not receiving the MMR vaccine.

The findings from this study suggest practice nurses assist in influencing parents in relation to decision making associated with immunising their children.

There is a need for further research to compare the views of parents who have had their children immunised with the MMR vaccine and those who have not. A wider range of participants in terms of ethnicity and language should be sought to explore whether there are different perceptions regarding the influence of the practice nurse; dependent on ethnicity. At a time when the incidence of measles and mumps are increasing in England and Wales, the role of the practice nurse as the largest group of primary care nurses in promoting the uptake of the MMR vaccine cannot be overlooked.

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