Nurse versus physician led-care for the management of paediatric asthma

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Summary and Discussion
SUMMARY AND DISCUSSION

Aim and Outline of the Thesis

This thesis discusses the role of a specialized nurse practitioner in the follow up of children with asthma in comparison with traditional care by a general practitioner or a paediatrician.

In addition, we evaluated the suitability of an existing questionnaire to assess quality of care and we evaluated a modified questionnaire on asthma knowledge.

Data on the effects on health care outcomes of the organizational structure of chronic care and interventions in such organizational structures are scarce. This is in contrast to the abundant data on therapeutic interventions.

For our studies we assumed that an asthma nurse is able to provide good asthma care by reinforcing the patient’s knowledge about asthma, ensuring adherence to a management plan, checking inhalation technique, and adjusting medication according to the guidelines [1].

In chapter 2 a systematic review on the subject “Nurse versus physician-led care for the management of asthma” is presented [2].

We reviewed the medical literature to find randomized controlled trials on care delivered by a specialized nurse compared to care by a doctor in the management of asthma. We found five studies [1;3-6] with in total 588 adults and children included. Although different outcome parameters were used in these studies, nurse-led care resulted in appropriate care in patients with well-controlled asthma compared to traditional physician-led care. Only one study reported on health care costs, which was comparable in both care settings [7]. Based on the relatively small number of studies in this review we concluded that nurse-led care might be appropriate in patients with well-controlled asthma.

In chapter 3, 4 and 5 we described a prospective randomized two-year follow-up study, comparing three different care settings: follow-up by a general practitioner, a paediatrician, or a hospital-based specialized asthma nurse. The study took place from 2007 – 2009 in a large community hospital and twelve general practices in the Netherlands. In total 107 children with moderate and stable asthma participated, of whom 45 were recruited from general practice and 62 from hospital. At baseline, and after one and two years, lung function measurements were performed. In addition, data on exacerbations, school absence, and parental absence from work, asthma control status, medication use and disease specific quality of care were collected.

In chapter 3 baseline data of this study are presented [8]. Children from general practices did not differ significantly from those in pediatric practice with respect to mean age, lung function tests, and daily dose of inhaled corticosteroids (ICS). The median asthma control questionnaire (ACQ) score was higher (representing poorer control) in the general practice group than in the pediatric practice group. In the general practice group a larger proportion of children were using combination ICS/long-acting β2-agonist (LABA).

In chapter 4 the two-year follow-up data of the randomized study are described [9]. We hypothesized that asthma management provided by a hospital-based specialised asthma nurse is not inferior to management provided by a general practitioner or a paediatrician. After two years, no significant differences between the three groups were found for airway responsiveness, FEV1, asthma control, medication, school absence or parental work absence. In the general practice group there was a significantly lower frequency of regular review visits compared to the pediatrician and specialized asthma nurse group. We found no significant differences in unplanned visits. In most cases the asthma nurse was able to provide care without consultation with the pediatrician. We concluded that the efficacy of specialized asthma nurse care in the outpatient management of stable childhood asthma is not inferior to traditional management by pediatricians or general practitioners.
In chapter 5 we presented the results of a study in which we assessed quality of care in paediatric asthma and used a disease-specific instrument, namely the Quality Of care Through the patient’s Eyes-Chronic Non Specific Lung Disease questionnaire (QUOTE-CNSLD) \(^9\). This questionnaire was revised to make it applicable in a paediatric population.

We concluded that the revised instrument is applicable in a pediatric population with asthma. Analyzing and rearranging the questions can define different domains of quality of care. Finally the instrument can be used to measure differences in the different settings of our randomized controlled trial \(^{10}\).

In chapter 6 we evaluated a newly constructed questionnaire on asthma knowledge \(^{11}\), which was the result of combining two previously constructed instruments \(^{12,13}\). The newly constructed questionnaire was completed in children with asthma and compared to children who attended hospital practice for other conditions; also retest properties were tested.

Furthermore, we investigated whether performance scores on this asthma knowledge questionnaire were related to asthma control status in the group of asthmatic children. Although the questionnaire discriminated between the two test groups, the internal consistency of this questionnaire was poor, with low Cronbach \(\alpha\) on health care outcomes in all predefined domains. There was also a poor correlation between the ACQ and the percentage of correct answers on the knowledge questionnaire. In conclusion, combining two previously constructed instruments did not result in a new instrument with good psychometric properties.

**Strength and Limitations of the studies**

In our clinical trial we attempted to reduce bias\(^{14}\) and succeeded in preventing allocation, incomplete outcome and selective reporting bias. However due to the character of the study, blinding was impossible. Although the type of caregiver might have an influence on adherence with medication and coping with asthma, this effect will be in the same direction as it will be in real life situations.

A further limitation was that for recruitment and follow-up of children with asthma in the general practice group we had to depend on general practitioners who were enthusiastic about participating in scientific research especially concerning respiratory care in children. An unselected sample of children with asthma recruited from an unselected sample of general practices was not feasible. This might have caused selection bias (before randomization) in that the results in our general practice group may have been more favourable than those in an unselected sample of general practitioners.

One might argue that we should have included symptom scores recorded in diaries to measure asthma control status. However, since reliable recording in diaries in a study of two years’ duration is not feasible, we choose to use the ACQ \(^{15-17}\), an acknowledged validated measure of asthma control.

During the years that we designed and performed our study the concept of “asthma control” instead of “asthma severity” was introduced in international guidelines \(^{18-20}\), which resulted in a shift of outcome parameters from lung function to symptom control parameters. In our study, airway-hyper-reactivity (AHR) was used as the primary outcome parameter. During the design phase of the study this surrogate outcome parameter was considered to reflect asthma severity. This appears to be a minor limitation since we also used the ACQ, making it easy to convert our data into the actual concept of asthma control. We used the degree of AHR of the participating children as the outcome parameter for our power calculation because good standard deviations for this parameter were available from comparable study populations \(^{21}\). It may be, that the number of children is too low if the power had been calculated based on the ACQ, but at the time of the design of the study, standard deviation data were not available.
In our study we did not access the cost aspects in the three treatment arms. This is a limitation of our study. We did assess to what extent the nurse practitioner could work self-dependently, without consulting with the paediatrician. The nurse practitioner could provide care independently and in a time efficient way in the majority of cases, indicating that physician-led care can be substituted by nurse-led care.

We failed to predefine adverse events when designing this study. However, we assumed that adverse events will be related to medication to a much greater extent than to the type of care setting. Also in the systemic review (chapter 2) we noticed, that other author’s did not specifically address the issue of adverse events.

In our study we did not include any measurement of adherence to therapy, which may have differed between the groups. Although this is considered an important parameter, the study contains a well-validated measure of asthma control status \cite{15,16}.

To our knowledge the revised version of the QUOTE-CNSLD questionnaire \cite{10} is the first instrument to assess quality of care and patient’s and parent’s preferences in pediatric asthma. However the instrument is derived from an instrument \cite{9} that was originally constructed and validated for an adult population. Although we found that the revised instrument was applicable in a pediatric population the assessment of its reliability and validity was not a part of our study.

We could find only one instrument in the literature for measuring knowledge of asthma that was developed for a pediatric population \cite{12}. This questionnaire however had borderline reliability and the author’s could not demonstrate a correlation between asthma knowledge and medication adherence suggesting a flaw in the construct validity. From the scarce asthma knowledge questionnaires developed in adult populations \cite{13} we selected an instrument that appeared to be reliable and was validated and attempted to construct a new knowledge of asthma questionnaire for children. However, the new instrument \cite{11} did not have adequate psychometric properties. Furthermore no correlation was found between knowledge level and asthma control status. Recent literature is in agreement with data, showing that knowledge level alone is a weaker determinant of asthma control, than patient’s beliefs and perceptions about asthma \cite{22-25}. This reduces the need for any kind of knowledge measurement.

**Implications for future research**

The literature contains many studies on nurse-led care. However there are only a small number of studies about the comparison of nurse versus physician-led care in asthma \cite{1,3-6}. This is also true for other chronic conditions \cite{26-28}. Given the importance of evaluating the organizational aspects of healthcare and their effects on patient related and health economic outcomes, this small number of studies is disappointing and a large field for future research still lies open.

Future studies about substituting physician-led care by nurse-led care should incorporate the following areas of research:

1. Disease specific endpoints.
2. Patient’s preferences and parent’s preferences.
3. Health economics and organization of care.
Defining asthma specific endpoints may appear to be self-evident. In practice many studies use different endpoint making it difficult or impossible to pool data in meta-analysis. In order to overcome this obstacle future researchers should define their endpoints with reference to that formulated by the ATS/ERS, in their publication "Asthma Control and Exacerbations, Standardizing Endpoints for Clinical Asthma Trials and Clinical Practice." Endpoints have shifted in the past decade from "hard" endpoint such as lung function (e.g. FEV1, or AHR), which are easy to pool, to "softer" endpoints such as asthma control. Well-validated instruments are currently available for these endpoints so that such data may now also be pooled. However, the importance of endpoints such as disease perception, patient’s beliefs and preferences, has recently been recognized. For many of the latter outcome measures validated instruments are not yet fully available. This is of relevance because these factors are important in determining adherence and adherence is strongly correlated with disease control.

Financing health care is becoming more and more an issue and therefore the importance of costs cannot be overstated. From the societal point of view, the indirect costs in terms of loss of productivity or loss of school education are as relevant as the direct costs. Although we did not examine this issue in this review, it might be speculated that extending nurse-led care is likely to lead to cost reduction. The issue of costs is even more important in countries where doctors are scarce and where it may be practically or financially prohibitive to access a physician. Therefore research in this field should also be encouraged in developing countries.

In some developed countries there is a movement to transfer care back to primary care in order to achieve health care savings. In the Netherlands, the introduction of a practice nurses in general practices is an example of this movement. These practice nurses increasingly provide care for patients with a chronic condition, such as asthma/COPD and diabetes. Especially in those countries it would be very worthwhile to investigate if nurse-led care in paediatric asthma could provide care of equal quality and at a lower cost.

Finally studies in more severe and/or uncontrolled asthma are necessary before introducing nurse-led care also in these types of patients.

Discussion and Conclusion

Our findings that asthma management provided by a hospital-based specialized asthma nurse is not inferior to management provided by a general practitioner or a pediatrician are in line with the earlier observations in a small number of studies.

Medical doctors are expensive and, in many parts of the world, scarce. Moreover, physicians have a wide variety of obligations limiting the time they have available for tasks in the care for patients with chronic conditions. In view of these facts, one may question whether this is an optimal way to deploy medical professionals? Nursing traditionally has a caring role as opposed to the therapeutic role of physicians. Although advanced nursing developed in the course of the twentieth century, a large proportion of nurses are still caring for patients on clinical wards or in primary care settings. These professionals have a relatively flat career perspective with limited options, and again, one may question whether this is an optimal way to deploy this dedicated group of professionals?

The trend to abolish the concept of caring for the nursing professionals and treating for the medical professionals opens up all sorts of additional career possibilities.
An immense shift has taken place from untreatable and often lethal diseases to treatable conditions causing a huge increase in demand for chronic care. This achievement, however, requires effort and comes at a very high price. In the second half of the twentieth century the public appreciation of this achievement was great in first world countries so that the financial consequences on national budgets were hardly a political issue. Gradually however health care expenditure as a percentage of the gross national product increased as well as the health care spending per capita. Currently health care is the number one expenditure in national budgets in all first world countries, making it a very contentious political issue. This changed the public view on health care expenses diametrically from socially priceless to the demand: “more for less”.

Further development of advanced nursing by training and employing specialized nurses for chronic care tasks is a viable solution to these problems and is an answer to the current call for cost-effectiveness. Nurse practitioners are rewarded on lower scales than physicians and furthermore the workload of physicians can be relieved considerably, creating the possibility to substitute physicians by nurse practitioners.

Acute cases and concerns in daily practice tend to take priority over the less urgent need to bring chronic illness under optimal management (a phenomenon characterized as “tyranny of the urgent”) (40;41). Physicians are mostly under time pressure and consequently have difficulties keeping to time schedules. In contrast, nurse practitioners responsible for specialized chronic care of patients are not distracted by other tasks and do have time to develop caregiver-patient relationship. Nurse practitioners can work in a setting with more time per patient enabling them to pay full attention to comprehensive patient information, including proper use of medication, other regimens and explanation about the disease aiming to enhance self-efficacy and adherence. Specially trained nurse practitioners can develop a vast amount of knowledge and experience in their field. The work setting can be adapted to the specific needs of the patients with the chronic disease in question, with information material and specific tools at hand. A “help desk” construction can be made for patients who have questions or problems in between regular review visits (42).

There are a number of prerequisites for new organization of healthcare. The patient should have stable and well-controlled asthma and the asthma nurse should work strictly according to guidelines. There should be a low threshold for consulting with a pediatrician or a general practitioner when a patient deteriorates or shows unexpected symptoms. Supervision or revision by the pediatrician or general practitioner should always take place when the asthma nurse is uncertain about the child’s management or diagnosis. Ultimately, the final responsibility remains in the hands of the supervising physician. This requires a setting where the pediatrician is always readily available to consult with the specialized nurse to prevent patients in chronic care from derailing and needing acute care. In our study setting (3) we fulfilled these conditions and demonstrated that the asthma nurse could work relatively independently, only requiring the assistance of the supervising pediatrician in a minority of cases.

In conclusion cost-effectiveness, efficient employment of human resources and quality aspects especially aimed to enhance adherence are strong reasons to move forward from physician-led care to nurse-led care in chronic diseases.
Summary and Discussion

REFERENCES


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