Determinants of use of health care services

in an integrated model
8.1 Introduction

In this chapter the results of the previous chapters will be used to examine if an integrated model on use of health care services in childhood can be constructed. First, the model proposed will be discussed where it concerns the choice of the variables. Secondly, a final integrated model will be constructed using the population of the study. Finally the results and the implications of this model for further research on use of health care services, especially in childhood, will be discussed.

8.2 Construction of the integrated model

The integrated model proposed will be constructed using the variables found to be relevant in the previous parts of this study. It was decided to include all not symptom-related variables that prove to be significant in either the predictive or the descriptive model. Even when these variables only show significance in univariate analyses, but not in multivariate analysis, they are included. One important need-factor influencing use of services proves to be the number of chronic symptoms in the child and this variable will be included in the model also.

In chapter 7 earlier findings are confirmed that the perception of seriousness of the symptom is an important cue to consultation. Parental experience is found to be an influential factor on the perception. A higher number of chronic symptoms will lead to a higher perception of seriousness, both directly as well as by influencing the parental perception of vulnerability of the child to disease. This parental perception of the child’s common health status will also be influenced by parental experience in raising children, indicated by the number of children in the family, parental psychological health status and parental educational level. On the other hand independence of socio-economic and demographic characteristics and parent’s perception of children’s health status has also been described. These variables all show certain influence on services use in either univariate or multivariate analyses using the predictive model of Andersen in Chapter 6. A perception of a better general health status of the child will have a
restraining effect on perception of seriousness of symptoms and on actions taken in case of symptoms in the child as is proved in analyses discussed in Chapter 6. Also a higher estimated health of the child is expected to have a restraining effect on the parental propensity of seeking care in childhood illness. A higher educational level is also expected to directly restrain perception of seriousness of symptoms, to reduce the propensity to seeking care in child’s symptoms and induce a less external oriented health locus of control. The role of educational level emerges in the predictive model studied in Chapter 6. A higher educational level of the mother negatively influences the volume of use of specialist services by the child. A more external health locus of control is expected in parents with more psychological problems. This external health locus of control is expected to induce more health care visits both directly and through inducing a higher propensity to seek care in child’s symptoms, because an external health orientation indicates a lesser ability of self-mastery and a higher reliance on other people. In Chapter 6 the role of an external health locus of control orientation is shown in univariate analyses. However, in those analyses a negative influence of an external health locus of control orientation is found, both for analyses of whether use of services would take place as well as for analyses on volume of use of services. Both findings are not significant in multivariate analysis though. A higher propensity of care-seeking is expected to induce more visits both directly and through inducing a higher perception of seriousness in case of symptoms in the child. A weak indication for a role of propensity to seek care is found in an univariate relationship to volume of use of services in Chapter 6. Here the variable has a negative influence on volume of visits by the child though. The variable is not significant in multivariate analysis. The final outcome-measure, action taken in case of symptoms, can either be no consultation, with the expectation to be able to solve the problem with own solutions, a consultation of relatives or friends, consultation of a GP or consultation of a specialist. In figure 8.1 the conceptualised integrated model is presented. In this figure the different variables that prove to have a significant relationship to use of services are presented within their conceptualised causal relationships. The arrows indicate which of the variables are of influence on what other variable; they represent the relationships between variables. The direction of the influence on the target-variable, positive or negative is also indicated. For example, the action taken in case of illness of the child will be more directed to physician-care if the perception of seriousness of the symptom is
higher. This perception is influenced by the parent’s perception of the child’s health in daily life; a better health perception will lead to a lower perception of seriousness of acute symptoms. Also the perception of seriousness is expected to be influenced by educational level of the mother; a higher educational level will lead to a lower perception of seriousness of acute symptoms. In this way all factors that are known can be introduced and their influence on the final action can be estimated.

8.3 Methods

The study is conducted in a population of children aged 2-6 years at the time of selection. Children are selected randomly through 6 GP-practices and 2 General Hospital Paediatric Outpatient Clinics. Parents of the children received a questionnaire in which a set of basic variables is questioned. Parents who returned this questionnaire received a follow-up questionnaire every three months during a nine-month period in which they were asked to answer a set of questions about the last illness-episode of the child in that three-month period. Only one illness-episode could be reported in each questionnaire. When in several of the three questionnaires of the same child, illness-periods were reported, only the first reported episode is included in the analysis. Both the variables of the basic questionnaire and the variables of the shorter three-month questionnaire are discussed in the chapters 6 and 7 of this study. The elements of the basic questionnaire that are used in the proposed model are the General Health Questionnaire, the Health Locus of Control questionnaire, parental propensity of seeking care in common childhood illnesses, parental perception of general health condition of the child, number of children in the family, educational level of the parents and the number of chronic symptoms of the child. These variables are, except for the last one, personality characteristics of the mother. As stated before, all these variables are measured prior to the follow-up questionnaires. The integrated model will be based only on variables answered by the mother of the child. Elements from the questionnaires that evaluate reported illness-episodes that will be used in the proposed model, are the parental perception of seriousness of the symptoms of the child and the actions taken as a consequence of the illness-episode. These variables can be characterised as situational characteristics. The outcome measure of the model is the action taken in case of symptoms.

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Four different levels of possible action are discerned:
1. only self-care, i.e. no action taken or the use of medication on one’s own initiative
2. asking advice from relatives or friends (lay-referral)
3. contacting a GP
4. contacting a specialist
Although several of these actions are possibly taken in one illness-episode, only the highest-ranking action is registered as final outcome measure.

8.4 Statistical methods

The analyses are conducted on data of the first reported illness-episode of the participating children. To construct the model a LISREL (linear structural relationships) analysis 9, using LISREL 8.3 Student Edition 10, is conducted. The conceptualised model is the starting model. In an iterating process one variable is added or removed from the model in every step. Removal of a variable occurs on t-test results in conjunction with content considerations concerning the conceptualised model. Adding variables occurs on basis of chi-square tests and content considerations also. In a total of 10 steps the final model is constructed.

8.5 Presentation of the integrated model

The construction of the model is based on data of the first reported illness-episode of children who experienced at least one illness-episode in the period of data-collection. Out of 764 distributed questionnaires 528 (69%) were returned (see Table 5.1). Out of the 528 children that participate in the study 52 (10%) did not have any reported illness. With another 23 children (4%) that did report at least one illness-episode, the parents did not complete all questions necessary for analysis.

A total of 453 illness-episodes can be used for the analysis needed to construct the model. In 253 of these episodes (56%) parents waited for the symptoms to resolve or gave medication without consulting others. In 20 episodes (4%) the final action of the parents was to ask advice from friends or relatives. A GP was contacted in 131 episodes (29%) as final action. A specialist was contacted as final action in 49 episodes (11%).

The constructed model based on the illness-episodes of these children is shown in figure 8.2. In this model the standardised
partial regression coefficients between variables are calculated and shown. The coefficients represent the change in the target-variable given a change of the basic variable of one point and no change in all the other variables. The coefficients represent a ‘unique’ influence. In our model e.g. the coefficient between ‘perception of seriousness’ and ‘action’ equals .41. This means that an action that is taken when the symptom is evaluated one point more serious (on a scale of five points in this study) will increase by 41%. In other words, when e.g. ten mothers would visit a GP when they give a symptom the score 1, an increase of the symptom-score to 2 would lead to a mean of four mothers taking an action that is one point higher and these will visit a specialist.

All paths shown in the model are statistically significant on the level of p<.05 as a result of the iterating process. The model represents the correlation matrix adequately, the minimum fit function chi-square equals 18.28 (df=14, p=.19). The root square residual equals .024. This residual indicates the mean difference between the empirical correlation matrix and the correlation matrix that is reproduced based on the path-coefficients. The adjusted Goodness of Fit Index equals .97, an Index >.95 is considered a ‘good’ fit. With a sample size of n=453, discrete and skew variables do not lead to convergence problems. In general there is no bias in parameter estimation and no bias of estimates in the standard errors and confidence intervals. There is no extreme skewness and therefore Chi-square goodness of fit estimates have zero or minor bias.
Figure 8.1 Conceptualised integrated model of determinants of use of health care services in childhood.
Determinta in an integrated model

Figure 8.2 Integrated model of determinants of use of health care services in childhood
The final model shows many relationships to be as expected and described in the hypothesised model. But also there are some relationships different from prior expectations. In the final model the action taken is clearly most influenced by the perception of seriousness of the present symptoms by the parents. Also the earlier experiences the parents have with their child’s health, which is measured by parental perception of child’s health, is of significant influence, both directly and through the perception of seriousness of the presenting symptoms. A third factor that influences the action taken is the health locus of control orientation of the mother. Contrary to our expectations the model shows that a more external health orientation has a restraining effect on the action taken. Nevertheless, this finding is in accordance with the relationship described in chapter 6 between internal health locus of control orientation and entrance to specialist’s care. An internal health locus of control orientation proves to be of significant influence on higher chance of visiting a specialist. An external health locus of control orientation does not implicate that the action of making others responsible for health problems is taken. Our findings suggest that parents with an external health locus of control orientation believe that even that action is a responsibility that has to be taken by others. The external health locus of control orientation is negatively influenced by the educational level of the mother and by the experience of the mother in raising children, indicated by the number of children in the family. The external orientation is positively influenced by mental health problems of the mother. In general the mother with an external health orientation appears to be the mother with less experience in growing children and less abilities to moderate the child’s symptoms. The external orientation is negatively influencing the parental perception of the child’s health, a relationship not expected in our conceptualised model but in concordance with the general picture that emerged from the mother with an external health orientation. It also shows a negative influence on parental propensity to seek care in childhood illness, this influence is opposite to the expected direction. The external health orientation is probably an indication of lack of confidence in professional health care services and the findings are in accordance with the general concept that an external health locus of control orientation indicates a feeling of inability to influence the environment. The variable ‘propensity of seeking care’ in the model is not behaving as was to be expected. Most relationships are opposite to
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expectations. The variable is behaving as a measure of ‘knowledge of medical problems in childhood’. A higher educational level and higher level of experience in raising children are both of positive influence on this variable. So, the mothers who are either experienced in health care problems with their earlier children or who are best able to interpret symptoms by knowledge, are more inclined to seek professional help in childhood symptoms when asked for at an arbitrary moment. But at the moment of actual symptoms this higher propensity of seeking care has a restraining effect on the perception of seriousness of symptoms. Also a higher educational level has a direct negative influence on the action taken. So, a better medical knowledge, i.e. a better ability to estimate the risks of certain health problems, has a restraining effect on perception of seriousness of symptoms and through that a restraining effect on the action taken.

Educational level of the mother is a relevant factor through influence on propensity of seeking care and through influence on the health locus on control, but also has a direct restraining influence on the action taken. All these relations indicate that the higher educated mother is less inclined to seek for professional help in case of health problems of the child because of a better ability to estimate when this help is necessary. Other than expected no significant direct effect of educational level on perception of seriousness of symptoms by the parents is found.

The parental perception of the child’s health before the study is a central variable in the model. Its influence is significant on the action taken both as a direct effect as well as through influencing the perception of seriousness of later symptoms. The parental perception of the child’s health is influenced negatively by an external health locus of control orientation of the mother and by mental health problems of the mother. It is a reflection of prior health problems of the child as indicated by the number of chronic symptoms the child experienced in the year before the start of the study.

This number of chronic symptoms is the most relevant factor in the action taken. Its influence is present through the parental perception of the child’s health but also through influencing the perception of seriousness of symptoms in an illness-episode. By this also in this model the need-factor is a very important determining factor in the choices made in case of illness.

In table 8.1 the effects of the different variables on the outcome-measure ‘action’ are summarised.
Table 8.1 Influences of all variables in the integrated model on ‘action’.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total influence</th>
<th>Indirect influence</th>
<th>Direct influence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of children</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>Mental health mother</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>Chronic illness</td>
<td>.17</td>
<td>.17</td>
<td>.00</td>
</tr>
<tr>
<td>Educational level mother</td>
<td>-.13</td>
<td>.02</td>
<td>-.15</td>
</tr>
<tr>
<td>External Health locus of control</td>
<td>-.14</td>
<td>.04</td>
<td>-.18</td>
</tr>
<tr>
<td>Parental perception health of child</td>
<td>-.23</td>
<td>-.06</td>
<td>-.17</td>
</tr>
<tr>
<td>Propensity of seeking care</td>
<td>-.07</td>
<td>-.07</td>
<td>.00</td>
</tr>
<tr>
<td>Perception of seriousness</td>
<td>.41</td>
<td>.00</td>
<td>.41</td>
</tr>
</tbody>
</table>

In table 8.2 the variance explained by the variables in the integrated model are summarised. All variables in the model explain 26% of the variance in actions taken.

Table 8.2 Squared multiple correlations ($R^2$) for the endogenous variables in the integrated model.

<table>
<thead>
<tr>
<th>Variable</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>External health locus of control orientation</td>
<td>.09</td>
</tr>
<tr>
<td>Parental perception of child’s health</td>
<td>.36</td>
</tr>
<tr>
<td>Propensity of seeking care</td>
<td>.16</td>
</tr>
<tr>
<td>Perception of seriousness</td>
<td>.09</td>
</tr>
<tr>
<td>Action</td>
<td>.26</td>
</tr>
</tbody>
</table>

8.6 Discussion

In this part of the study the aim is to construct an integrated model of determining factors of use of health care services in childhood. The aim is to combine the approach of predictive and descriptive models. A clear model emerges from the data on actions taken by the parents in case of illness of the child. The model explains 26% of variance in actions taken by the parents.

First of all it has to be noted that the parents manage 60% of the illness-episodes without help of a professional. It has to be taken into account that this percentage will be even higher in an unselected population. In a recent study in a general population only 7% of childhood illness episodes led to a GP-consultation.\(^{12}\)
The higher propensity of help-seeking in this study is likely to be due to the fact that part of the children in the population are selected on expected high-use of health care services. Furthermore the decision when to report symptoms as an illness-episode was left to the parents and therefore it is likely there is a bias to more intensive symptoms in the reported illness-episode, compared to studies that evaluate all symptoms reported in a diary and where the researcher defines the illness-episode. This probably also explains the relatively high percentage of illness-episodes in which a specialist is consulted.

As is the case in all prior multivariate studies, need-factors are very important influencing factors. The number of chronic symptoms of a child in itself is a factor that can not easily be changed; increasing possibilities in treatments are necessary to decrease the direct influence of chronic health conditions on use of health care services. Nevertheless our integrated model shows that the indirect effect of chronic illness in children through parental perception is more significant than the direct effect. This effect of perceived vulnerability of the child related to a medical condition and its effect on use of health care services was also found in other health care studies. By increasing the knowledge of parents on chronic health conditions of their child, the perception of the child’s health condition and the perception of seriousness of acute health problems will possibly change. This possibility is also suggested by the influence of experience by the parents and their educational level on propensity of seeking care. Better estimating abilities of health risks reduce the perception of seriousness of acute problems. The number of children with a background of chronic illness is still growing because of improving treatments. Notably the increasing survival of premature birth is of consequence for the health of these children for many years. Following this model, especially in this group of children with chronic illness, thorough accompaniment of parents and education on the background illness of their child will probably influence the call on professional help in case of minor illness. To be more able to support the parents, also preventive- and primary-care health care workers have to be better educated in the consequences of growing chronic childhood illness. Earlier detection of late consequences of these chronic illnesses will be an important additional effect of this education. In general this model shows how education can influence the action in case of child’s symptoms. But together with the elements like number of children in the family the emerging picture is that not merely knowledge but especially also the ability to moderate the symptoms is important.
The external health locus of control orientation of parents has a restraining effect on use of health care services. An explanation for this effect may be that the external orientation is an indication of lack of confidence in the abilities of the physicians to solve the problems of the child in case of everyday-symptoms. In a study on return-visits in paediatric practice, it turned out that children of lower educated parents had more negative experiences with the health care system and subsequently visited less often\(^9\). This model also shows the influence of lower educational level on external health locus of control orientation and subsequently on the action taken. In his study Kai discussed that the interpersonal relationship between parents and physician is an important factor on this effect. Information is easier to communicate to well-educated parents. Lower-educated parents probably feel more often not appreciated in their concern about the health of the child because there is a difficulty in communication of information. There often appears to be a disparity between parents’ beliefs and expectations about illness and treatment and the professionals’ behaviour\(^20\). The barrier experienced by these parents may be lifted by better addressing the expectations and beliefs of parents and giving information on the particular level of need. Noteworthy though, in the analysis of use of services using a descriptive model (chapter 7) the need for information is not a significant variable in the decision whether professional help would be sought in an illness-episode. However, as also suggested by Kai, results indicate that parents feel a need to share their concerns with a professional and want to be treated and informed on a more equal basis with accurate instructions on when to contact again in case of change of symptoms. Information and education of parents therefore needs to be directed to the specific problems of their child. Groupwise education or booklets on common childhood illness problems are not an equal alternative\(^21\). Direct information from a physician or a specialised nurse on a personal basis is likely to be much more effective and results of this approach in daily practice, e.g. in asthma- and diabetes-care, are very satisfying.

The final action taken by the parents is often not a decision taken independently. Especially consulting a specialist in the Netherlands is often a decision taken in consultation with a GP. The influence of the GP is not part of the study. In daily practice it is clear that it is difficult for many GP’s to manage the problems related to chronic childhood illnesses. Most people rightly experience their GP as their central point for evaluation of health problems. The tasks of the GP are still increasing and it is increasingly difficult to meet them all. Childhood chronic illness is increasing, e.g. through increasing
survival of premature birth or childhood cancer, but also through increasing incidence of illnesses like asthma or diabetes in childhood. Uncertainties about health problems in these children felt by the GP also reflect on the perception of the parents of their child’s health. A shift of, relatively, common childhood health problems in children with chronic problems from GP to specialist will probably increasingly take place if GP’s can not keep up with the increasing demands. Reinforcement of GP-facilities combined with education on chronic childhood health problems may have a clear effect on demands for specialist’s evaluation.

The other variables in the model are not factors that leave possibilities for change. Only the health locus of control orientation is a factor that shows a suggestion to change by primarily education in the integrated model. This can only be achieved on a long-term basis though.

In this model two elements of the concept of protoprofessionalization are clearly present. A protoprofessionalised person is a person that is close to medical culture in daily life. This person has close social contacts with medical professionals, is familiar with the possibilities of medical services, knows the influence of health behaviour on health, and has a strong sense of self-mastery in health locus of control orientation. There is a strong relationship between protoprofessionalization and use of health care services. In this study in particular the elements of knowledge and of health locus of control orientation prove to be present and support the protoprofessionalization theory also for use of health care services in childhood. In this study the more protoprofessionalised parent is using less health care services for the child.

Although the construction of the model is based on largely prospectively measured variables still improvements are to be expected in future research. One of the important variables is the perception of seriousness of symptoms. This variable is measured retrospectively and, as already discussed in chapter 7, measuring this variable at the moment of presentation and before the physician has given an opinion on the presented problem may even further clarify the process of parental decision-making. Also, a further evaluation of the role of the health locus of control by using more specific questionnaires like the Parent Health Locus of Control Scales can probably further elucidate the decision-making process. Furthermore the influence of physicians on the process needs to be included in further research. They can influence the decision-making process, e.g. by instructions given by earlier visits when to
contact in case of repeated problems, or by referral of children to a specialist by GP’s. But, the larger part of the parents in our study decided they could handle the situation by themselves and this is a major advantage of this study; also the decision-making process of parents that did not visit is evaluated.

8.7 Conclusion

In this chapter an integrated model of determinants of use of health care services in childhood is presented. Referring to the second and third research-questions of the study it became clear that the parental decision-making process in case of symptoms in the child is primarily influenced by earlier experiences. First, experience of prior illness and chronic conditions. Second, experience in raising children and the ability to make an estimation of seriousness of problems by this experience and by intellectual faculties. An external health locus of control orientation primarily indicates an inactive behaviour of the parent in case of symptoms. Mutability of the decision-making process primarily lies in educating parents and primary care givers about the problems of chronic illness.
8.8 Literature


Determinants in an integrated model