BMJ Open

Exploring novel strategies in managing primary healthcare demand of young children. The impact of demand strategies on decision-making for out-of-hours primary care

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2016-014605
Article Type:	Research
Date Submitted by the Author:	06-Oct-2016
Complete List of Authors:	Giesen, Marie-Jeanne; Radboud university medical center, Radboud Institute for Health Sciences, Scientific Center for Quality of Healthcare; Tilburg University, TiasNimbas Business School Keizer , E ; Radboud University Medical Center, Scientific Center for Quality of Healthcare; van de Pol, Julia; Radboud university medical center, Radboud Institute for Health Sciences, Scientific Center for Quality of Healthcare Knoben, Joris; Radboud University, Institute for Management Research Wensing, Michel; Radboud University Medical Centre, Radboud Institute for Health Sciences, Scientific Center for Quality of Healthcare Giesen, Paul; Radboud University Medical Centre, Radboud Institute for Health Sciences, Scientific Center for Quality of Healthcare
Primary Subject Heading:	General practice / Family practice
Secondary Subject Heading:	Emergency medicine
Keywords:	after hours care, decision making, primary health care, demand strategies, online advice, co-payment

Exploring novel strategies in managing primary healthcare demand of young children.

The impact of demand strategies on decision-making for out-of-hours primary care

Marie-Jeanne Giesen[a,b], Ellen Keizer[a], Julia van de Pol[a], Joris Knoben[c], Michel Wensing[a,d], Paul Giesen[a]

[a] Radboud university medical center, Radboud Institute for Health Sciences, Scientific Center for Quality of Healthcare (IQ healthcare), P.O. Box 9101, Nijmegen, The Netherlands

[b] TiasNimbas Business School, Tilburg University, Warandelaan 2, 5037, AB, Tilburg, the Netherlands

[c] Radboud University, Institute for Management Research, P.O. Box 9102, 6500 HC, Nijmegen, The Netherlands

[d] University Hospital Heidelberg, Department of General Practice and Health Services Research, Marsilius-Arkaden, Turm West, Im Neuenheimer Feld 130.3, 69120 Heidelberg, Heidelberg, Germany

Corresponding author:

Ellen Keizer

Radboud university medical center

P.O. Box 9101, 114 IQ healthcare

6500 HB Nijmegen

The Netherlands

E-mail address: Ellen.Keizer@radboudumc.nl

Telephone number: +31 24 3619641

ABSTRACT

Objective

To explore the potential impact of demand strategies on patient decision-making in medically nonurgent and urgent scenarios during out-of-hours for children between the age of 0 and 4 years.

Design and methods

We conducted a cross-sectional survey with paper-based case scenarios. A survey was sent to all 797 parents of children aged between 0 and 4 years from four Dutch GP practices. Four demand-strategies (co-payment, online advice, financial transparency and GP appointment next morning) were incorporated in two medically nonurgent and two urgent case scenarios.

Results

The response rate was 47.4%. The strategy 'online advice' led to more medically appropriate decision making for both nonurgent case scenarios (OR 0.26; CI 0.11-0.58) and urgent case scenarios (OR 0.16; CI 0.08-0.32). Financial transparency (OR 0.59; CI 0.38-0.92) and a GP appointment planned the next morning (OR 0.57; CI 0.34-0.97) had some influence on patient decisions for urgent cases, but not for nonurgent cases. Co-payment had no influence on patient decisions.

Conclusion

Online advice has the highest potential to reduce medically unnecessary use. Furthermore it enhanced safety of parents decisions on seeking help for their young children during out-of-hours primary care. Valid online information on health symptoms for patients should be promoted.

ARTICLE SUMMARY

Strengths and limitations of this study:

- The study sample was representative for the Dutch population
- Both nonurgent and urgent cases scenarios were used to test the demand strategies
- Hypothetical situations were used to test the demand strategies
- Only one amount of the co-payment and its effectiveness was tested

KEYWORDS

after hours care, primary health care, decision making, demand strategies, online advice, co-payment, health services accessibility

INTRODUCTION

In the Netherlands out-of-hours primary care is provided by general practitioner cooperatives (GPCs) and is intended for urgent complaints that cannot wait until the next day [1]. However, half of the requests are medically nonurgent [2] and many of these requests can wait until office hours or can be managed with self-care. Inappropriate, nonurgent contacts affect the motivation of triage nurses and GPs, and result in a higher workload which could negatively affect the quality of out-of-hours primary care [3, 4]. Also, a consultation with the GPC is more expensive (about 100 euro) than a consultation during office hours (40 euro). GPs are looking for measures to reduce the number of patients with nonurgent complaints, such as co-payment for patients, stricter triage, and a larger role for the telephone consultation doctor [4].

To support patient decision-making on healthcare use during out-of-hours and regulate demand for primary healthcare a number of strategies could be effective. Demand management strategies are widely used in the service industry to enable effective and efficient use of capacity. When applied in healthcare, these strategies have the potential to influence the patient's perceived demand through education, financial incentives, or organisational rescheduling [4-6]. Accordingly they can reduce demand that is unlikely to improve health [5, 6] while having minimal effect on genuine, urgent cases so as not to jeopardise appropriate care. Demand strategies are patient-targeted methods, which approach the aim to prevent overcrowding and enhance the efficiency of the healthcare system, while maintaining high standards of quality and accessibility. The main demand management strategy currently used at GPCs is telephone triage [6]. However patients continue to visit the GPC directly, or get 'through' the triage system, with nonurgent complaints. GPs see these patients with nonurgent complaints as one of the most negative aspects of the GPC system [3].

Giesen *et al.* (2009) found that, of all patient populations, parents with children between the age of 0 and 4 years most often contact the GPC with nonurgent conditions. In many of these cases, it would be more appropriate to visit the GP during daytime or apply self-care from a medical and societal perspective [7]. Previous research also showed that childhood fever does account for a large workload at GPCs [8]. Considering the potential effects of demand management strategies in healthcare, it would be valuable to explore which demand strategies could be effective to reduce nonurgent demand at GPCs for this specific population. The objective of our study was to explore the potential impact of demand strategies on patient decision-making in both medically nonurgent and urgent scenarios during out-of-hours for children between the age of 0 and 4 years.

METHODS

Design, setting and population

We conducted a cross-sectional survey with paper-based case scenarios. Four GP practices from both rural and urban areas in the east of the Netherlands participated. A survey was sent to all families in their patient population with children aged between 0 and 4 years (N=797). A reminder was sent two weeks after the first invitation. The study was conducted between 2013 and 2015.

Questionnaire

A questionnaire was developed over several rounds by researchers and medical professionals. The questionnaire included questions about the background of the patient (gender, age, education level, income, number of children, age oldest and youngest child), followed by questions related to the paper-based case scenarios. Two pilot studies were conducted to ensure the validity of the survey and test its user friendliness. In the first pilot study a convenience sample of individuals participated and in the second pilot study 16 patients from one GP practice participated.

Strategies

In combining the insights on demand for out-of-hours primary care with the findings from previous studies on decision-making and demand strategies in healthcare, there are several strategies that can potentially be effective to influence the demand for GPCs[3-5, 7]. We identified the following demand strategies to be tested in our research: co-payment, online advice, financial transparency and direct GP appointment next morning.

Co-payment can be implemented via a fee that has to be paid directly by the patient. We set the fee for a GPC at 75 Euros and for the Emergency Department at 150 Euros. Online advice is based on the principle to support patients in their decision making. We presented online advice that was given by an application certified by the Dutch Society of GPs (NHG). This strategy does not limit the entry to the GPC like co-payment does, and may therefore be considered an interesting alternative to the co-payment strategy. Another possible effective demand strategy is to give patients insight into the cost of medical treatments. This strategy would be a midway option between the somewhat controversial co-payment and education on medical conditions via online advice. The fourth demand strategy tested is to enable patients to make an immediate next-working-day appointment with their GP via an online scheduling system. This strategy might give patients the certainty of an appointment during office hours, and might thus reduce the probability they will contact a GPC for a health condition that is nonurgent. This strategy would be particularly relevant to

the patient group who sought the services of a GPC but were unable to reach their own GP or make an appointment during office hours [9].

Case scenarios

The case scenarios were used in an early study about telephone triage and were presented to an expert panel consisting of three triage nurses and three GPs [10]. The expert panel determined the 'reference standard' regarding the appropriate type of care. We included two nonurgent and two urgent common cases (Appendix A). The nonurgent cases were cases for which contact with the GPC (the same day) was not medically necessary and the urgent cases were cases for which contact with the GPC (the same day) was medically necessary. Combining the case scenarios selected with the demand strategies, 16 cases were devised (four scenarios each with four demand strategies). To test all scenario-demand strategy combinations, four questionnaires were developed. Every questionnaire contained a total of four scenarios: three case scenarios with a demand strategy and one 'baseline' case scenario without a demand strategy. Due to a mistake in one of the cases in the questionnaire, we excluded the answers of one case of 141 respondents. The baseline case scenario was included to test how respondents would react in the different case scenarios when no demand strategy was included.

The effects of demand strategies on patient decision-making were verified by testing if the choices made by respondents match the reference standard of the expert panel. To test this, we rearranged the answers into categories. The answers to the nonurgent scenarios were categorized into 'medically appropriate demand' or 'over-demand', while the answers to the urgent scenarios were categorized into 'under-demand', 'medically appropriate demand' and 'over-demand' (Table 1).

Table 1. Classification answer categories

Nonurgent scenario		
Answer category		**Classification**
1.	I would wait/ apply self-care solutions	Medically appropriate demand
2.	I would contact my General Practitioner during office hours	
3.	I would contact the General Practitioners' Cooperation	Over-demand
4.	I would visit the Emergency Department	
5.	I would call 112 (emergency line)	

Urgent scenario		
Answer category		**Classification**
1.	I would wait/ apply self-care solutions	Under-demand
2.	I would contact my General Practitioner during office hours	
3.	I would contact the General Practitioners' Cooperation	Medically appropriate demand
4.	I would visit the Emergency Department	Over-demand
5.	I would call 112 (emergency line)	

Statistical analyses

Descriptive statistics were used to describe the characteristics of the respondents and the percentages of over-and under-demand for each strategy. Over- and under-demand have been tested separately by logistic regression analysis at case level with the choices of the parents as outcome of interest. The answers to the baseline case scenarios served as a reference category, meaning that both nonurgent and urgent scenarios presented with demand strategies have been tested against answers given for the baseline scenarios. We corrected for patient characteristics (gender, age, amount of children, education level and income), and added the variable GP practice to account for clustering of patients within GP practices. Analyses were performed in SPSS 22.0.

RESULTS

Characteristics of respondents

The response rate was 47.3% (N=377), providing answers to 1367 cases. Of the respondents 42.5% lived in urban areas, 17% in suburban areas and 40.6% in rural areas (Table 2). Most of the participants finished tertiary school (41.6%) and indicated their income as similar to the average Dutch household income (34.5%) [11]. The average number of children per parent was 2.1. The mean age of the oldest child was 4.8 years and of the youngest child 1.7 years.

Table 2. Characteristics of respondents (N=377)

	%	N		%	N
Gender parent			**Area**		
Female	86.7	327	Rural area	40.6	153
Male	13.3	50	Suburban area	17.0	64
			Urban area	42.5	160
Age parent					
17 – 22	2.1	8	**Number of children**		
23 – 27	13.5	51	1	30.0	113
28 – 32	30.8	116	2	45.4	171
33 – 37	30.5	115	3	16.4	62
38 – 42	17.0	64	4	4.8	18
43 – 48	4.8	18	≥ 5	3.0	13
Missing	1.3	5	(Mean = 2.1)		
Education			**Age youngest child**		
No education	0.5	2	0	14.6	55
Primary school	2.4	9	1	15.1	57
Lower secondary education	11.7	44	2	21.8	82
Intermediate vocational education	41.6	157	3	13.5	51
Higher secondary education	8.0	30	4	4.2	16
Higher vocational education	25.2	95	Missing	30.8	116
University degree	9.3	35	(Mean = 1.7)		
Missing	1.3	5			
			Age oldest child		
Family Income			0 to 4	52.8	199
> €56800	34.2	129	5 to 9	38.2	144
About € 56800	34.5	130	10 to 14	7.2	27
< €56800	27.6	104	15 to 21	1.9	7
Missing	3.7	14	(Mean = 4.8)		

Case scenarios

For the nonurgent scenarios, 41.7% of the parents made an over-demand choice [Table 3). For the urgent scenarios 50.3% of the respondents made an under-demand choice and 3.9% an over-demand choice.

Table 3. Under- and over-demand for case scenarios at baseline (N=371)

	Over-demand chosen		Medically appropriate demand chosen		Under-demand chosen	
Scenario	%	N	%	N	%	N
Total nonurgent scenarios	**41.7**	**90**	**0.0**	**0**	**58.3**	**126**
Swallow marble	*78.2*	*79*	*0.0*	*0*	*21.8*	*22*
Earache	*9.6*	*11*	*0.0*	*0*	*90.4*	*104*
Total urgent scenarios	**3.9**	**6**	**50.3**	**78**	**45.8**	**71**
Fever	*1.2*	*1*	*79.0*	*64*	*19.8*	*16*
Diarrhoea	*6.8*	*5*	*18.9*	*14*	*74.3*	*55*

Case scenarios with demand strategies

The percentage of parents who made an over-demand choice for the nonurgent case scenarios without a demand strategy was overall 41.7% (Table 4). By providing the strategy 'online advice' the percentage of over-demand decreased to 11.3%, a reduction of 30.4%. The strategy 'pay medical cost' was found to reduce the probability of over-demand to 31.7%, realizing a decrease of 10.0% compared to the baseline strategy. We did not find large differences when the strategies 'GP consult planned' and 'Overview of medical cost' were used (resp. 44.4% and 35.2% over-demand).

Of the respondents, 50.3% chose an under-demand solution for the urgent case scenarios without a demand strategy ('baseline'). When using the strategy 'online advice', 16.5% chose an under-demand solution, a decrease of 33.8%. The strategy 'financial transparency' reduced the probability of under-demand to 39.4%, a reduction of 10.9%. With the use of the strategy 'GP consult planned', the probability of an under-demand decision was 41.0%, a decrease of 9.7%. The strategy 'co-payment' seems to have no influence since with it 50.0% still chose an under-demand solution.

Table 4. Over- and under-demand for each demand strategy (%)

	Over-demand for nonurgent case scenarios (N=609)		Under-demand for urgent case scenarios (N=752)	
	%	N	%	N
Baseline strategy	**41.7**	**90**	**50.3**	**78**
Online advice	11.3	8	16.5	15
Co-payment	31.7	39	50.0	88
GP consult planned	44.4	48	41.0	50
Financial transparency	35.2	32	39.4	82

Influence of demand strategies on nonurgent and urgent case scenarios

Table 5 shows that when the strategy 'online advice' was used for the nonurgent cases, parents more frequently made a medically appropriate healthcare choice (OR 0.26; CI 0.11-0.58). The other strategies had no influence on the decisions of the parents in nonurgent cases. We also found that parents with more than one child made an appropriate choice more often than parents with just one child (OR 0.64; CI 0.43-0.96). For the urgent cases, we found that the application of online advice influences parent decision-making positively, resulting in more medically appropriate choices (OR 0.16; CI 0.08-0.32). The strategy of showing the medical costs of a visit to the GPC also results in more medically appropriate choice behaviour (OR 0.59; CI 0.38-0.92), as did the strategy of offering the patient the option to plan a medical consultation with the GP (OR 0.57; CI 0.34-0.97). Furthermore, parents with more than one child more frequently chose an under-demand solution for a high-urgent condition (OR 2.04; CI 1.39-2.98) and similarly older parents more regularly chose an under-demand solution (OR 0.95; CI 0.92-0.98).

Table 5. Logistic regression for over-demand and under-demand[1]

	Over-demand for nonurgent case scenarios[2] (N=591)		Under-demand for urgent case scenarios [3] (N=734)	
Variables	OR	95% CI	OR	95% CI
Strategy: Online advice	**0.26**	**0.11-0.58***	**0.16**	**0.08-0.32***
Strategy: Co-payment	0.62	0.38-1.03	0.84	0.53-1.33
Strategy: GP consult planned	0.81	0.49-1.35	**0.57**	**0.34-0.97***
Strategy: Overview medical cost	0.97	0.56-1.70	**0.59**	**0.38-0.92***
Gender parent: male	0.91	0.52-1.57	0.69	0.42-1.15
Age parents	1.01	0.97-1.05	**0.95**	**0.92-0.98***
> 1 child	**0.64**	**0.43-0.96***	**2.04**	**1.39-2.98***
Highly educated	1.07	0.71-1.63	0.93	0.64-1.35
High income	1.07	0.71-1.63	0.94	0.65-1.37

[1] GP practice was added to account for clustering of patients within GP practices

[2] Reference category: medically appropriate choice

[3] Reference category: medically appropriate choice or over-demand

OR = Odds Ratio; CI = Confidence Interval

*P<0.05, in bold

DISCUSSION AND CONCLUSION

Discussion

The findings of this study imply that decisions on healthcare seeking by parents of young children can be influenced. For both nonurgent and urgent case scenarios, about half of the parents did not chose the most appropriate decision. Demand strategies have the potential to help patients make medically appropriate decisions. The strategy 'online advice' seems to have the highest potential to positively influence patient demand as it influenced decisions in both urgent and nonurgent cases. The use of this strategy has both the potential of reducing medically unnecessary use of the GPC and could also enhance safety in healthcare, as patients are more likely to contact a doctor in urgent cases. Comparable results have been found in studies on the management of chronic diseases such as depression and lower back pain [12-14]. In the questionnaire a relatively customized advice (applicable to the specific condition) was presented, and it was mentioned that the advice was given by an online application certified by the Dutch Society of GPs (NHG). This set-up of posting a 'certified' and customized advice might have had a positive influence on the patients' willingness to follow it. This is also mentioned by parents in a British study about information needs of parents for acute childhood illness [15].

Even though 9 in 10 inhabitants in the Netherlands access the internet every day, it is still debatable whether all would actually use an online application if they would be worried or panicking about their (child's) condition. Also, it is essential to remain vigilant to how access limitations might exclude certain groups of society from accessing such information. A recent study shows that people that are older, have a higher income or live in rural areas are less likely to use mobile health applications [16]. On the other hand, access to internet on smart phones or notebooks is also high in socially deprived populations.

We also found that implementing co-payment or financial transparency did not affect patient decision making for nonurgent scenarios. In addition, for the urgent case scenarios there was no influence from implementing co-payment, which would imply that it does not affect patient safety. Other studies also found that co-payment was not an important driver for patient decision making [17, 18], but other studies did found some effects of co-payment. A study at the Emergency Department showed a reduction in demand from patients with nonurgent conditions [19]. In line with this outcome, some argue that co-payment stimulates patients to consider whether they really need healthcare at that moment. This would eventually contribute to lowering collective healthcare costs [20]. On the other hand, critics argue that the fee could deter patients with serious illnesses from visiting the Emergency Department [21] and could lead to greater inequity, especially for socially deprived patients [22, 23].

While we expected the 'GP consult planned' demand strategy to affect the nonurgent cases, it only appeared to affect patient decision making positively in relation to urgent conditions. Seemingly those seeking help for a nonurgent problem are not easily influenced by an organizational strategy.
Regarding patient characteristics, we found that patients with more children seem to make more under-demand healthcare choices, resulting in less over-demand. A possible explanation is that these parents, due to experience, are less prone to panick. Interestingly, they seem more likely to underestimate medical urgencies. Also, the probability that parents will choose an under-demand solution increases when a parent is older, we could philosophize that older parents are more able to assess a healthcare problem.

Strengths and weaknesses and recommendations for further research

The selected sample is diverse in terms of residential zones, income, education, age and number of children. These characteristics reflect the Dutch population.[2] We chose to use written case scenarios. A drawback of this design is that respondents were confronted with hypothetical situations, consequently emotional reactions or actual financial payments that occur in a real-life situations are not completely reflected in this research. On the other hand, the information scenario was closer to reality (responders actually received it), which have enhanced the impact of this strategy. Prospective evaluation studies of demand strategies, ideally designed as randomized trials, are required to examine their impact.
We used two nonurgent and two urgent case scenarios to test the demand strategies. Although the cases were validated by an expert panel and they had consensus about the appropriate choice, we saw great differences in answers between the two urgent cases. We noticed that many parents chose an under-demand solution for one of the urgent cases (child with fever). In hindsight, since we did not expect such a high percentage of parents to make an under-demand choice for the urgent case scenarios (especially for the child with fever case), this case may not have been the best scenario with which to test the demand strategies. Further research using more, alternate case scenarios is needed to confirm the results of this study.
There might be a relation to the amount of the co-payment and its effectiveness.[4] In this research we only tested one amount for the GPC, but if policymakers would want a more conclusive assessment of this strategy, different amounts should be tested. Finally, although the described strategies were merely effective under either urgent or nonurgent conditions, it would be interesting to research the effects of implementing strategies simultaneously. For example, combining online advice and online financial transparency in the costs could possibly increase the effectiveness.

Conclusion

We conclude that there are demand strategies which can influence a patient's ability to make medically appropriate healthcare choices for urgent and nonurgent conditions during out-of-hours. Guiding and advising patients online appears to have high potential, as it influences patient decision-making positively in both urgent and nonurgent conditions. Advising patients on what decision to take when a health condition occurs offers the patients a level of certainty that can positively influence their decision-making. Further research with more case scenarios is needed to confirm the results of this study.

Practice Implications

Our study can have broad implications in a world where more people use the internet and policy makers are struggling to limit healthcare costs while maintaining high quality and safety in healthcare. This research shows the great potential of online health applications and we believe that an independent, certified and customized tool, such as thuisarts.nl [24], should be promoted. It may lead to a reduction in the use of GPCs for nonurgent complaints that could wait until the next day and to safer use for patients with urgent complaints.

ACKNOWLEDGEMENTS

We would like to thank all the GP practices who participated in this research.

FUNDING

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

COMPETING INTERESEST

All authors have completed the ICMJE uniform disclosure form at www.icmje.org/coi_disclosure.pdf and declare: no support from any organisation for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous three years; no other relationships or activities that could appear to have influenced the submitted work.

ETHICS APPROVAL

The research ethics committee of the Radboud university medical center (CMO Arnhem-Nijmegen) was consulted and concluded that the study does not fall within the remit of the Medical Research Involving Human Subjects Act (WMO)(file number: 2016/2870).

DATA SHARING STATEMENT

The dataset will be available on request.

AUTHORS CONTRIBUTIONS

MJG designed the study, gathered the data, participated in performing the statistical analyses, interpreted the data and drafted the manuscript. EK designed the study, participated in performing the statistical analyses, interpreted the data and drafted the manuscript. JP helped to gather data, participated in the interpretation of the data and drafted the manuscript. JK designed the study, performed the statistical analyses and revised the manuscript critically. MW participated in the interpretation of the data and revised the manuscript critically for important intellectual content. PG designed the study, participated in the interpretation of the data and revised the manuscript critically. All authors read and approved the final manuscript.

REFERENCES

1. Giesen P, Smits M, Huibers L, et al. Quality of after-hours primary care in the Netherlands: a narrative review. *Ann Intern Med* 2011;155(2):108-13.
2. Ineen. Benchmarkbulletin huisartsenposten 2014 [Benchmark report GP cooperatives 2014]. 2015.
3. Smits M, Keizer E, Huibers L, et al. GPs' experiences with out-of-hours GP cooperatives: a survey study from the Netherlands. *Eur J Gen Pract* 2014;20(3):196-201.
4. Keizer E, Maassen I, Smits M, et al. Reducing the use of out-of-hours primary care services: A survey among Dutch general practitioners. *Eur J Gen Pract* 2016:1-7.
5. Vickery DM, Lynch WD. Demand management: enabling patients to use medical care appropriately. *J Occup Environ Med* 1995;37(5):551-7.
6. Bryant CD. Demand management and case management: a conservation strategy. *Prof Case Manag* 2007;12(5):272-80; quiz 81-2.
7. Giesen P, Hammink A, Mulders A, et al. Te snel naar de huisartsenpost [Too easy to go to the GP cooperative]. *Medisch contact* 2009;06:239-42.
8. de Bont EG, Lepot JM, Hendrix DA, et al. Workload and management of childhood fever at general practice out-of-hours care: an observational cohort study. *BMJ Open* 2015;5(5):e007365.
9. Smits M, Peters Y, Broers S, et al. Association between general practice characteristics and use of out-of-hours GP cooperatives. *BMC Fam Pract* 2015;16:52.
10. Smits M, Hanssen S, Huibers L, et al. Telephone triage in general practices: A written case scenario study in the Netherlands. *Scand J Prim Health Care* 2016;34(1):28-36.
11. Centraal Bureau voor de Statistiek [Statistics Netherlands]. Gemiddeld inkomen: particuliere huishoudens naar diverse kenmerken [Average income; private households to various characteristics]. [http://statline.cbs.nl/Statweb/publication/?DM=SLNL&PA=70843NED&D1=4&D2=0&D3=0-4&D4=11-14&VW=T]. Accessed 26-09-2016.
12. Andersson G, Cuijpers P. Internet-based and other computerized psychological treatments for adult depression: a meta-analysis. *Cogn Behav Ther* 2009;38(4):196-205.
13. Berger T, Hammerli K, Gubser N, et al. Internet-based treatment of depression: a randomized controlled trial comparing guided with unguided self-help. *Cogn Behav Ther* 2011;40(4):251-66.
14. Buhrman M, Faltenhag S, Strom L, et al. Controlled trial of Internet-based treatment with telephone support for chronic back pain. *Pain* 2004;111(3):368-77.

15. Jones CH, Neill S, Lakhanpaul M, et al. Information needs of parents for acute childhood illness: determining 'what, how, where and when' of safety netting using a qualitative exploration with parents and clinicians. *BMJ Open* 2014;4(1):e003874.
16. Bhuyan SS, Lu N, Chandak A, et al. Use of Mobile Health Applications for Health-Seeking Behavior Among US Adults. *J Med Syst* 2016;40(6):153.
17. de Valk J, Taal EM, Nijhoff MS, et al. Self-referred patients at the Emergency Department: patient characteristics, motivations, and willingness to make a copayment. *Int J Emerg Med* 2014;7:30.
18. Philips H, Remmen R, De Paepe P, et al. Use of out-of-hours services: the patient's point of view on co-payment a mixed methods approach. *Acta Clin Belg* 2013;68(1):1-8.
19. Reitsma-van Rooijen M, Jong de J. Betalen voor de SEH schrikt af [Paying for the emergency department scares]. *Medisch contact* 2010;65(29-30):1479-81.
20. Robinson R. *User charges for health care.* Buckingham, UK: Open University Press, 2002.
21. Hsu J, Price M, Brand R, et al. Cost-sharing for emergency care and unfavorable clinical events: findings from the safety and financial ramifications of ED copayments study. *Health Serv Res* 2006;41(5):1801-20.
22. Lostao L, Regidor E, Geyer S, et al. Patient cost sharing and social inequalities in access to health care in three western European countries. *Soc Sci Med* 2007;65(2):367-76.
23. Kelaher M, Dunt D, Day S, et al. Effects of financial disadvantage on use and non-use of after hours care in Australia. *Health Policy* 2006;79(1):16-23.
24. Drenthen T, Beijaert RP, Jansen PW, et al. Thuisarts.nl, hoe bevalt dat? Ervaringen na 3 jaar Thuisarts.nl [What do you think of Thuisarts.nl? Experiences after 3 years of www.Thuisarts.nl]. *Ned Tijdschr Geneeskd* 2014;158:A8282.

Appendix A: Cases

Nonurgent cases

Swallow marble

Your three-year-old child swallowed a marble. Your child does not mention to be in pain, is not nauseous, and does not cough. Your child does not have a background of medical problems, nor use any medicine. It is Saturday afternoon and your own GP is not available.

Earache

Your child is 4 years old and has had an earache since last night. Your child does not have fever, is conscious and alert, but has a cold (coughs and a runny nose). Your child does not have any other health problems and has a temperature of 36,7°C. It is Wednesday evening, 20.00 h and you cannot reach your own GP anymore.

Urgent cases

Fever

Your child is 8 months old and has fever. Last week your child had a cold, fever and was coughing seriously. It seemed that your child got better, but the fever (39,1°C) returned. Your child drinks little and still coughs. It is Tuesday evening 19.00 h, and you cannot reach your own GP anymore.

Diarrhoea

Your 1,5 year old child has been feeling ill for the past 2 days. Your child indicates he has a stomach-ache, is vomiting and has fluid Diarrhoea. You are worried because your child drinks little and has a temperature of 38,6°C. It is unclear if your child still gets wet diapers because of the Diarrhoea. You do notice that your child has a dry mouth. Your child does not have a medical history. It is Sunday morning, and your own GP is not available.

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	2
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4
Objectives	3	State specific objectives, including any prespecified hypotheses	4
Methods			
Study design	4	Present key elements of study design early in the paper	5
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	5
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	5
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	5,6
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	5,6
Bias	9	Describe any efforts to address potential sources of bias	*5,6*
Study size	10	Explain how the study size was arrived at	5
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	6
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	7
		(*b*) Describe any methods used to examine subgroups and interactions	n.a.
		(*c*) Explain how missing data were addressed	n.a.
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	n.a.
		(*e*) Describe any sensitivity analyses	n.a.
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	7
		(b) Give reasons for non-participation at each stage	n.a.
		(c) Consider use of a flow diagram	n.a.
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	7
		(b) Indicate number of participants with missing data for each variable of interest	7
Outcome data	15*	Report numbers of outcome events or summary measures	8
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	9-10
		(*b*) Report category boundaries when continuous variables were categorized	n.a.
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	n.a.
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	n.a.
Discussion			
Key results	18	Summarise key results with reference to study objectives	10
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	11
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	10-11
Generalisability	21	Discuss the generalisability (external validity) of the study results	12
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	13

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

BMJ Open

The impact of demand management strategies on parents' decision-making for out-of-hours primary care: Findings from a survey in the Netherlands

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2016-014605.R1
Article Type:	Research
Date Submitted by the Author:	01-Mar-2017
Complete List of Authors:	Giesen, Marie-Jeanne; Radboud university medical center, Radboud Institute for Health Sciences, Scientific Center for Quality of Healthcare; Tilburg University, TiasNimbas Business School Keizer , E ; Radboud University Medical Center, Scientific Center for Quality of Healthcare; van de Pol, Julia; Radboud university medical center, Radboud Institute for Health Sciences, Scientific Center for Quality of Healthcare Knoben, Joris; Radboud University, Institute for Management Research Wensing, Michel; Radboud University Medical Centre, Radboud Institute for Health Sciences, Scientific Center for Quality of Healthcare Giesen, Paul; Radboud University Medical Centre, Radboud Institute for Health Sciences, Scientific Center for Quality of Healthcare
Primary Subject Heading:	General practice / Family practice
Secondary Subject Heading:	Emergency medicine
Keywords:	after hours care, decision making, primary health care, online advice, co-payment, demand management strategies

The impact of demand management strategies on parents' decision-making for out-of-hours primary care: Findings from a survey in the Netherlands

Marie-Jeanne Giesen[a,b], Ellen Keizer[a], Julia van de Pol[a], Joris Knoben[c], Michel Wensing[a,d], Paul Giesen[a]

[a] Radboud university medical center, Radboud Institute for Health Sciences, Scientific Center for Quality of Healthcare (IQ healthcare), P.O. Box 9101, Nijmegen, The Netherlands

[b] TiasNimbas Business School, Tilburg University, Warandelaan 2, 5037, AB, Tilburg, the Netherlands

[c] Radboud University, Institute for Management Research, P.O. Box 9102, 6500 HC, Nijmegen, The Netherlands

[d] University Hospital Heidelberg, Department of General Practice and Health Services Research, Marsilius-Arkaden, Turm West, Im Neuenheimer Feld 130.3, 69120 Heidelberg, Heidelberg, Germany

Corresponding author:

Ellen Keizer

Radboud university medical center

P.O. Box 9101, 114 IQ healthcare

6500 HB Nijmegen

The Netherlands

E-mail address: Ellen.Keizer@radboudumc.nl

Telephone number: +31 24 3619641

ABSTRACT

Objective

To explore the potential impact of demand management strategies on patient decision-making in medically nonurgent and urgent scenarios during out-of-hours for children between the age of 0 and 4 years.

Design and methods

We conducted a cross-sectional survey with paper-based case scenarios. A survey was sent to all 797 parents of children aged between 0 and 4 years from four Dutch GP practices. Four demand management strategies (co-payment, online advice, overview medical cost and GP appointment next morning) were incorporated in two medically nonurgent and two urgent case scenarios. Combining the case scenarios with the demand management strategies resulted in 16 cases (four scenarios each with four demand management strategies). Each parent randomly received a questionnaire with three different case scenarios with three different demand strategies and a baseline case scenario without a demand management strategy.

Results

The response rate was 47.4%. The strategy online advice led to more medically appropriate decision making for both nonurgent case scenarios (OR 0.26; CI 0.11-0.58) and urgent case scenarios (OR 0.16; CI 0.08-0.32). Overview of medical cost (OR 0.59; CI 0.38-0.92) and a GP appointment planned the next morning (OR 0.57; CI 0.34-0.97) had some influence on patient decisions for urgent cases, but not for nonurgent cases. Co-payment had no influence on patient decisions.

Conclusion

Online advice has the highest potential to reduce medically unnecessary use. Furthermore it enhanced safety of parents decisions on seeking help for their young children during out-of-hours primary care. Valid online information on health symptoms for patients should be promoted.

ARTICLE SUMMARY

Strengths and limitations of this study:

- The study sample was representative for the Dutch population
- Both nonurgent and urgent cases scenarios were used to test the demand management strategies
- Hypothetical situations were used to test the demand management strategies
- Only one amount of the co-payment and its effectiveness was tested

KEYWORDS

after hours care, primary health care, decision making, demand management strategies, online advice, co-payment, health services accessibility

INTRODUCTION

In the Netherlands out-of-hours primary care is provided by general practitioner cooperatives (GPCs) and is intended for urgent complaints that cannot wait until the next day [1]. However, half of the requests are medically nonurgent [2] and many of these requests can wait until office hours or can be managed with self-care. Inappropriate, nonurgent contacts affect the motivation of triage nurses and GPs, and result in a higher workload which could negatively affect the quality of out-of-hours primary care [3, 4]. Also, the cost for a consultation at the GPC are higher (about 100 euro) than for a consultation during office hours (40 euro). These costs are not directly paid by patients. Patients pay a monthly overall premium to their health insurance providers. Primary care is exempted from co-payment by patients, contrary to most other types of healthcare. GPs are looking for measures to reduce the number of patients with nonurgent complaints, such as co-payment for patients, stricter triage, and a larger role for the telephone consultation doctor [4].

To support patient decision-making on healthcare use during out-of-hours and regulate demand for primary healthcare a number of strategies could be effective. Demand management strategies are widely used in the service industry to enable effective and efficient use of capacity. When applied in healthcare, these strategies have the potential to influence the patient's perceived demand through education, financial incentives, or organisational rescheduling [4-6]. Accordingly they can reduce demand that is unlikely to improve health [5, 6] while having minimal effect on genuine, urgent cases so as not to jeopardise appropriate care. Demand management strategies are patient-targeted methods, which approach the aim to prevent overcrowding and enhance the efficiency of the healthcare system, while maintaining high standards of quality and accessibility. The main demand management strategy currently used at GPCs is telephone triage [6]. However patients continue to visit the GPC directly, or get 'through' the triage system, with nonurgent complaints. GPs see these patients with nonurgent complaints as one of the most negative aspects of the GPC system [3].

Giesen *et al.* (2009) found that, of all patient populations, parents with children between the age of 0 and 4 years most often contact the GPC with nonurgent conditions. In many of these cases, it would be more appropriate to visit the GP during daytime or apply self-care from a medical and societal perspective [7]. Previous research also showed that childhood fever does account for a large workload at GPCs [8]. Considering the potential effects of demand management strategies in healthcare, it would be valuable to explore which demand management strategies could be effective to reduce nonurgent demand at GPCs for this specific population. The objective of our study was to explore the potential impact of demand management strategies on patient decision-making in both medically nonurgent and urgent scenarios during out-of-hours for children between the age of 0 and 4 years.

METHODS

Design, setting and population

We conducted a cross-sectional survey with paper-based case scenarios. Four GP practices from both rural and urban areas in the east of the Netherlands participated. A survey was sent to all families in their patient population with children aged between 0 and 4 years (N=797). A reminder was sent two weeks after the first invitation. The study was conducted between 2013 and 2015.

Questionnaire

A questionnaire was developed over several rounds by researchers and medical professionals. The questionnaire included questions about the background of the patient (gender, age, education level, income, number of children, age oldest and youngest child), followed by questions related to the paper-based case scenarios. Two pilot studies were conducted to ensure the validity of the survey and test its user friendliness. In the first pilot study a convenience sample of individuals participated and in the second pilot study 16 patients from one GP practice participated.

Strategies

In combining the insights on demand for out-of-hours primary care with the findings from previous studies on decision-making and demand management strategies in healthcare, there are several strategies that can potentially be effective to influence the demand for GPCs[3-5, 7]. We identified the following demand management strategies to be tested in our research: co-payment, online advice, overview medical cost and direct GP appointment next morning (Appendix A).

Co-payment can be implemented via a fee that has to be paid directly by the patient. We set the fee for a GPC at 75 Euros and for the Emergency Department at 150 Euros. Online advice is based on the principle to support patients in their decision making. We presented online advice that was given by an application certified by the Dutch Society of GPs (NHG). This strategy does not limit the entry to the GPC like co-payment does, and may therefore be considered an interesting alternative to the co-payment strategy.

Another possible effective demand management strategy is to give patients insight into the cost of medical treatments. This strategy would be a midway option between the somewhat controversial co-payment and education on medical conditions via online advice. The fourth demand management strategy tested is to enable patients to make an immediate next-working-day appointment with their GP via an online scheduling system. This strategy could give patients the certainty of an appointment during office hours, and might thus reduce the probability they will contact a GPC for a health condition that is nonurgent. This strategy would

be particularly relevant to the patient group that sought the services of a GPC but were unable to reach their own GP or make an appointment during office hours [9].

Case scenarios

The case scenarios were used in an early study about telephone triage and were presented to an expert panel consisting of three triage nurses and three GPs [10]. The expert panel determined the 'reference standard' regarding the appropriate type of care. We included two nonurgent and two urgent common cases (Appendix B). The nonurgent cases were cases for which contact with the GPC (the same day) was not medically necessary and the urgent cases were cases for which contact with the GPC (the same day) was medically necessary. Combining the case scenarios selected with the demand management strategies, 16 cases were devised (four scenarios each with four demand management strategies). To test all scenario-demand strategy combinations, four questionnaires were developed. Combining the case scenarios with the demand management strategies resulted in 16 cases (four scenarios each with four demand management strategies). Each parent randomly received a questionnaire with three different case scenarios with three different demand strategies and a baseline case scenario without a demand management strategy. Due to a mistake in one of the cases in the questionnaire, we excluded the answers of 141 respondents regarding that case. The baseline case scenario was included to test how respondents would react in the different case scenarios when no demand management strategy was included.

The effects of demand management strategies on patient decision-making were verified by testing if the choices made by respondents matched the reference standard of the expert panel. To test this, we rearranged the answers into categories. The answers to the nonurgent scenarios were categorized into 'medically appropriate demand' or 'over-demand', while the answers to the urgent scenarios were categorized into 'under-demand', 'medically appropriate demand' and 'over-demand' (Table 1).

Table 1. Classification answer categories

Nonurgent scenario		
Answer category		**Classification**
1.	I would wait/ apply self-care solutions	Medically appropriate demand
2.	I would contact my General Practitioner during office hours	
3.	I would contact the General Practitioners' Cooperation	Over-demand
4.	I would visit the Emergency Department	
5.	I would call 112 (emergency line)	

Urgent scenario		
Answer category		**Classification**
1.	I would wait/ apply self-care solutions	Under-demand
2.	I would contact my General Practitioner during office hours	
3.	I would contact the General Practitioners' Cooperation	Medically appropriate demand
4.	I would visit the Emergency Department	Over-demand
5.	I would call 112 (emergency line)	

Statistical analyses

Descriptive statistics were used to describe the characteristics of the respondents and the percentages of over-and under-demand for each strategy. Over- and under-demand have been tested separately by logistic regression analysis at case level with the choices of the parents as outcome of interest. The answers to the baseline case scenarios served as a reference category, meaning that both nonurgent and urgent scenarios presented with demand management strategies have been tested against answers given for the baseline scenarios. We corrected for patient characteristics (gender, age, amount of children, education level and income), and added the variable GP practice to account for clustering of patients within GP practices. Analyses were performed in SPSS 22.0.

RESULTS

Characteristics of respondents

The response rate was 47.3% (N=377), providing answers to 1367 cases. Of the respondents 42.5% lived in urban areas, 17% in suburban areas and 40.6% in rural areas (Table 2). Most of the participants finished tertiary school (41.6%) and indicated their income as similar to the average Dutch household income (34.5%) [11]. The average number of children per parent was 2.1. The mean age of the oldest child was 4.8 years and of the youngest child 1.7 years.

Table 2. Characteristics of respondents (N=377)

	%	N		%	N
Gender parent			**Area**		
Female	86.7	327	Rural area	40.6	153
Male	13.3	50	Suburban area	17.0	64
			Urban area	42.5	160
Age parent					
17 – 22	2.1	8	**Number of children**		
23 – 27	13.5	51	1	30.0	113
28 – 32	30.8	116	2	45.4	171
33 – 37	30.5	115	3	16.4	62
38 – 42	17.0	64	4	4.8	18
43 – 48	4.8	18	≥ 5	3.0	13
Missing	1.3	5	(Mean = 2.1)		
Education			**Age youngest child**		
No education	0.5	2	0	14.6	55
Primary school	2.4	9	1	15.1	57
Lower secondary education	11.7	44	2	21.8	82
Intermediate vocational education	41.6	157	3	13.5	51
Higher secondary education	8.0	30	4	4.2	16
Higher vocational education	25.2	95	Missing	30.8	116
University degree	9.3	35	(Mean = 1.7)		
Missing	1.3	5			
			Age oldest child		
Family Income			0 to 4	52.8	199
> €56800	34.2	129	5 to 9	38.2	144
About € 56800	34.5	130	10 to 14	7.2	27
< €56800	27.6	104	15 to 21	1.9	7
Missing	3.7	14	(Mean = 4.8)		

Case scenarios

Regarding the nonurgent scenarios, 41.7% of the parents made an over-demand choice [Table 3). For the urgent scenarios 50.3% of the respondents made an under-demand choice and 3.9% an over-demand choice.

Table 3. Under- and over-demand for case scenarios at baseline (N=371)

	Over-demand chosen		Medically appropriate demand chosen		Under-demand chosen	
Scenario	%	N	%	N	%	N
Total nonurgent scenarios	**41.7**	**90**	**58.3**	**126**	**0.0**	**0**
Swallow marble	*78.2*	*79*	*21.8*	*22*	*0.0*	*0*
Earache	*9.6*	*11*	*90.4*	*104*	*0.0*	*0*
Total urgent scenarios	**3.9**	**6**	**50.3**	**78**	**45.8**	**71**
Fever	*1.2*	*1*	*79.0*	*64*	*19.8*	*16*
Diarrhoea	*6.8*	*5*	*18.9*	*14*	*74.3*	*55*

Case scenarios with demand management strategies

Overall, the percentage of parents that made an over-demand choice for the nonurgent case scenarios without a demand management strategy was 41.7% (Table 4). By providing the strategy 'online advice' the percentage of over-demand decreased by 30.4%. The strategy 'co-payment' was found to reduce the probability of over-demand to 31.7%, realizing a decrease of 10.0% compared to the baseline strategy. We did not find large differences when the strategies 'GP consult planned' and 'overview of medical cost' were used.

An under-demand solution for the urgent case scenarios without a demand strategy ('baseline') was chosen by 50.3%. When using the strategy 'online advice' 16.5% chose an under-demand solution, a decrease of 33.8%. The strategy 'overview medical cost' reduced the probability of under-demand by 10.9%. With the use of the strategy 'GP consult planned', the probability of an under-demand decision was decreased by 9.7%. The strategy 'co-payment' seems to have no influence since with this strategy 50.0% still chose an under-demand solution.

Table 4. Over- and under-demand for each demand management strategy (%)

	Over-demand for nonurgent case scenarios (N=609)		Under-demand for urgent case scenarios (N=752)	
	%	N	%	N
Baseline strategy	**41.7**	**90**	**50.3**	**78**
Online advice	11.3	8	16.5	15
Co-payment	31.7	39	50.0	88
GP consult planned	44.4	48	41.0	50
Overview medical cost	35.2	32	39.4	82

Influence of demand management strategies on nonurgent and urgent case scenarios

Table 5 shows that when the strategy 'online advice' was used for nonurgent cases, parents more frequently made a medically appropriate healthcare choice (OR 0.26; CI 0.11-0.58). The other strategies had no influence on the parents' decisions in nonurgent cases. We also found that parents with more than one child made an appropriate choice more often than parents with just one child (OR 0.64; CI 0.43-0.96).

For the urgent cases, we found that the application of online advice influences parent decision-making positively, resulting in more medically appropriate choices (OR 0.16; CI 0.08-0.32). The strategy of showing the medical cost of a visit to the GPC also results in more medically appropriate choice behaviour (OR 0.59; CI 0.38-0.92), as did the strategy of offering the patient the option to plan a medical consultation with the GP (OR 0.57; CI 0.34-0.97). Furthermore, parents with more than one child more frequently chose an under-demand solution for a high-urgent condition (OR 2.04; CI 1.39-2.98) and similarly older parents more regularly chose an under-demand solution (OR 0.95; CI 0.92-0.98).

Table 5. Logistic regression for over-demand and under-demand[1]

	Over-demand for nonurgent case scenarios (N=591)		Under-demand for urgent case scenarios (N=734)	
Variables	OR	95% CI	OR	95% CI
Strategy: Online advice	**0.26**	**0.11-0.58***	**0.16**	**0.08-0.32***
Strategy: Co-payment	0.62	0.38-1.03	0.84	0.53-1.33
Strategy: GP consult planned	0.81	0.49-1.35	**0.57**	**0.34-0.97***
Strategy: Overview medical cost	0.97	0.56-1.70	**0.59**	**0.38-0.92***
Gender parent: male	0.91	0.52-1.57	0.69	0.42-1.15
Age parents	1.01	0.97-1.05	**0.95**	**0.92-0.98***
> 1 child	**0.64**	**0.43-0.96***	**2.04**	**1.39-2.98***
Highly educated	1.07	0.71-1.63	0.93	0.64-1.35
High income	1.07	0.71-1.63	0.94	0.65-1.37

[1] GP practice was added to account for clustering of patients within GP practices

OR = Odds Ratio; CI = Confidence Interval

*P<0.05, in bold

DISCUSSION AND CONCLUSION

Discussion

The findings of this study imply that decisions on healthcare seeking by parents of young children can be influenced. For both nonurgent and urgent case scenarios, about half of the parents did not chose the most medically appropriate decision. Demand management strategies have the potential to help patients make medically appropriate decisions. The strategy 'online advice' seems to have the highest potential to positively influence patient demand as it influenced decisions in both urgent and nonurgent cases. The use of this strategy has both the potential of reducing medically unnecessary use of the GPC and could also enhance safety in healthcare, as patients are more likely to contact a doctor in urgent cases. Comparable results have been found in studies on the management of chronic diseases such as depression and lower back pain [12-14]. In the questionnaire a relatively customized advice (applicable to the specific condition) was presented, and it was mentioned that the advice was given by an online application certified by the Dutch Society of GPs (NHG). This set-up of posting a 'certified' and customized advice might have had a positive influence on the patients' willingness to follow it. This is also mentioned by parents in a British study about information needs of parents for acute childhood illness [15]. In addition, the capabilities of the person receiving the advice, also influences the way a person acts upon it.

Even though 9 in 10 inhabitants in the Netherlands access the internet every day, it is still debatable whether all would actually use an online application if they would be worried or panicking about their (child's) condition. Also, it is essential to remain vigilant to how access limitations might exclude certain groups of society from accessing such information. A recent study shows that people that are older, have a higher income or live in rural areas are less likely to use mobile health applications [16]. On the other hand, access to internet on smart phones or notebooks is also high in socially deprived populations.

We also found that implementing co-payment or giving an overview of the medical cost did not affect patient decision making for nonurgent scenarios. In addition, for the urgent case scenarios there was no influence from implementing co-payment, which would imply that it does not affect patient safety. Other studies also found that co-payment was not an important driver for patient decision making [17, 18], but other studies did found some effects of co-payment. A study at the Emergency Department showed a reduction in demand from patients with nonurgent conditions [19]. In line with this outcome, some argue that co-payment stimulates patients to consider whether they really need healthcare at that moment. This would eventually contribute to lowering collective healthcare costs [20]. On the other hand, critics argue that the fee could deter patients with serious illnesses from visiting the Emergency Department [21] and could lead to greater inequity, especially for socially deprived patients [22, 23].

While we expected the 'GP consult planned' demand management strategy to affect the nonurgent cases, it only appeared to affect patient decision making positively in relation to urgent conditions. Seemingly those seeking help for a nonurgent problem are not easily influenced by an organizational strategy.

Regarding patient characteristics, we found that patients with more children seem to make more under-demand healthcare choices, resulting in less over-demand. A possible explanation is that these parents, due to experience, are less prone to panic. Interestingly, they seem more likely to underestimate medical urgencies. Also, the probability that parents will choose an under-demand solution increases when a parent is older, we could philosophize that older parents are more able to assess a healthcare problem.

Strengths and weaknesses and recommendations for further research

The selected sample is diverse in terms of residential zones, income, education, age and number of children. These characteristics reflect the Dutch population.[2] We chose to use written case scenarios. A drawback of this design is that respondents were confronted with hypothetical situations, consequently emotional reactions or actual financial payments that occur in a real-life situations are not completely reflected in this research. Besides, it is possible that the respondents were eager to answer 'correctly', especially for the cases in which the strategy online advice was incorporated as they were provided with information about the appropriate response. This may have inflated the effect of this strategy. On the other hand, the information scenario was closer to reality (responders actually received it), which have enhanced the impact of this strategy. Prospective evaluation studies of demand management strategies, ideally designed as randomized trials, are required to examine their impact.

We used two nonurgent and two urgent case scenarios to test the demand management strategies. Although the cases were validated by an expert panel and they had consensus about the appropriate choice, we saw great differences in answers between the two urgent cases. We noticed that many parents chose an under-demand solution for one of the urgent cases (child with fever). In hindsight, since we did not expect such a high percentage of parents to make an under-demand choice for the urgent case scenarios (especially for the child with fever case), this case may not have been the best scenario to test the demand management strategies. Further research using more, alternate case scenarios is needed to confirm the results of this study.

There might be a relation to the amount of the co-payment and its effectiveness.[4] In this research we only tested one amount for the GPC, but if policymakers would want a more conclusive assessment of this strategy, different amounts should be tested. Finally, although the described strategies were merely effective under either urgent or nonurgent conditions, it would be interesting to research the effects of implementing strategies simultaneously. For example, combining online advice and online overview of medical cost could possibly increase the effectiveness of the strategies.

Conclusion

We conclude that there are demand management strategies which can influence a patient's ability to make medically appropriate healthcare choices for urgent and nonurgent conditions during out-of-hours. Guiding and advising patients online appears to have high potential, as it influences patient decision-making positively in both urgent and nonurgent conditions. Advising patients on what decision to take when a health condition occurs offers the patients a level of certainty that can positively influence their decision-making. Further research with more case scenarios is needed to confirm the results of this study. It is also necessary to study the impact of this strategy on patient safety in practice.

Practice Implications

Our study can have broad implications in a world where more people use the internet and policy makers are struggling to limit healthcare costs while maintaining high quality and safety in healthcare. This research shows the great potential of online health applications and we believe that an independent, certified and customized tool, such as thuisarts.nl [24], should be promoted. It may lead to a reduction in the use of GPCs for nonurgent complaints that could wait until the next day and to safer use for patients with urgent complaints.

ACKNOWLEDGEMENTS

We would like to thank all the GP practices who participated in this research.

FUNDING

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

COMPETING INTERESEST

All authors have completed the ICMJE uniform disclosure form at www.icmje.org/coi_disclosure.pdf and declare: no support from any organisation for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous three years; no other relationships or activities that could appear to have influenced the submitted work.

ETHICS APPROVAL

The research ethics committee of the Radboud university medical center (CMO Arnhem-Nijmegen) was consulted and concluded that the study does not fall within the remit of the Medical Research Involving Human Subjects Act (WMO)(file number: 2016/2870).

DATA SHARING STATEMENT

The dataset will be available on request.

AUTHORS CONTRIBUTIONS

MJG designed the study, gathered the data, participated in performing the statistical analyses, interpreted the data and drafted the manuscript. EK designed the study, participated in performing the statistical analyses, interpreted the data and drafted the manuscript. JP helped to gather data, participated in the interpretation of the data and drafted the manuscript. JK designed the study, performed the statistical analyses and revised the manuscript critically. MW participated in the interpretation of the data and revised the manuscript critically for important intellectual content. PG designed the study, participated in the interpretation of the data and revised the manuscript critically. All authors read and approved the final manuscript.

REFERENCES

1. Giesen P, Smits M, Huibers L, et al. Quality of after-hours primary care in the Netherlands: a narrative review. *Ann Intern Med* 2011;155(2):108-13.
2. Ineen. Benchmarkbulletin huisartsenposten 2014 [Benchmark report GP cooperatives 2014]. 2015.
3. Smits M, Keizer E, Huibers L, et al. GPs' experiences with out-of-hours GP cooperatives: a survey study from the Netherlands. *Eur J Gen Pract* 2014;20(3):196-201.
4. Keizer E, Maassen I, Smits M, et al. Reducing the use of out-of-hours primary care services: A survey among Dutch general practitioners. *Eur J Gen Pract* 2016:1-7.
5. Vickery DM, Lynch WD. Demand management: enabling patients to use medical care appropriately. *J Occup Environ Med* 1995;37(5):551-7.
6. Bryant CD. Demand management and case management: a conservation strategy. *Prof Case Manag* 2007;12(5):272-80; quiz 81-2.
7. Giesen P, Hammink A, Mulders A, et al. Te snel naar de huisartsenpost [Too easy to go to the GP cooperative]. *Medisch contact* 2009;06:239-42.
8. de Bont EG, Lepot JM, Hendrix DA, et al. Workload and management of childhood fever at general practice out-of-hours care: an observational cohort study. *BMJ Open* 2015;5(5):e007365.
9. Smits M, Peters Y, Broers S, et al. Association between general practice characteristics and use of out-of-hours GP cooperatives. *BMC Fam Pract* 2015;16:52.
10. Smits M, Hanssen S, Huibers L, et al. Telephone triage in general practices: A written case scenario study in the Netherlands. *Scand J Prim Health Care* 2016;34(1):28-36.
11. Centraal Bureau voor de Statistiek [Statistics Netherlands]. Gemiddeld inkomen: particuliere huishoudens naar diverse kenmerken [Average income; private households to various characteristics]. [http://statline.cbs.nl/Statweb/publication/?DM=SLNL&PA=70843NED&D1=4&D2=0&D3=0-4&D4=11-14&VW=T]. Accessed 26-09-2016.
12. Andersson G, Cuijpers P. Internet-based and other computerized psychological treatments for adult depression: a meta-analysis. *Cogn Behav Ther* 2009;38(4):196-205.
13. Berger T, Hammerli K, Gubser N, et al. Internet-based treatment of depression: a randomized controlled trial comparing guided with unguided self-help. *Cogn Behav Ther* 2011;40(4):251-66.
14. Buhrman M, Faltenhag S, Strom L, et al. Controlled trial of Internet-based treatment with telephone support for chronic back pain. *Pain* 2004;111(3):368-77.

15. Jones CH, Neill S, Lakhanpaul M, et al. Information needs of parents for acute childhood illness: determining 'what, how, where and when' of safety netting using a qualitative exploration with parents and clinicians. *BMJ Open* 2014;4(1):e003874.
16. Bhuyan SS, Lu N, Chandak A, et al. Use of Mobile Health Applications for Health-Seeking Behavior Among US Adults. *J Med Syst* 2016;40(6):153.
17. de Valk J, Taal EM, Nijhoff MS, et al. Self-referred patients at the Emergency Department: patient characteristics, motivations, and willingness to make a copayment. *Int J Emerg Med* 2014;7:30.
18. Philips H, Remmen R, De Paepe P, et al. Use of out-of-hours services: the patient's point of view on co-payment a mixed methods approach. *Acta Clin Belg* 2013;68(1):1-8.
19. Reitsma-van Rooijen M, Jong de J. Betalen voor de SEH schrikt af [Paying for the emergency department scares]. *Medisch contact* 2010;65(29-30):1479-81.
20. Robinson R. *User charges for health care.* Buckingham, UK: Open University Press, 2002.
21. Hsu J, Price M, Brand R, et al. Cost-sharing for emergency care and unfavorable clinical events: findings from the safety and financial ramifications of ED copayments study. *Health Serv Res* 2006;41(5):1801-20.
22. Lostao L, Regidor E, Geyer S, et al. Patient cost sharing and social inequalities in access to health care in three western European countries. *Soc Sci Med* 2007;65(2):367-76.
23. Kelaher M, Dunt D, Day S, et al. Effects of financial disadvantage on use and non-use of after hours care in Australia. *Health Policy* 2006;79(1):16-23.
24. Drenthen T, Beijaert RP, Jansen PW, et al. Thuisarts.nl, hoe bevalt dat? Ervaringen na 3 jaar Thuisarts.nl [What do you think of Thuisarts.nl? Experiences after 3 years of www.Thuisarts.nl]. *Ned Tijdschr Geneeskd* 2014;158:A8282.

Appendix A: Demand management strategies

Co-payment

Contacting the GPC will cost 75 euros, which will not be reimbursed by the insurance company. The cost for visiting the Emergency Department or calling 112 will be 150 euro, a fee that will also not be reimbursed by the insurance company. *

** This is an hypothetical situation, in the current situation all cost for visiting a GPC or Emergency Department are reimbursed by the insurance company for children younger than 18 years old.*

Online advice

Urgent cases

When you check the symptoms of your child online, via an App developed by the Dutch GP Association, you get the advice to contact the GPC.

Nonurgent cases

Swallow marble:

When you check the symptoms of your child online, via an App developed by the Dutch GP Association, you get the following advice:

Give your child something to drink and (if necessary) reassure your child. Check if the marble is coming with your child's stool.

Earache:

When you check the symptoms of your child online, via an App developed by the Dutch GP Association, you get the following advice:

Give your child something to drink and (if necessary) a painkiller. Reassure your child and let your child sleep.

Overview medical cost

Contacting the GPC will cost 75 euros, visiting the Emergency Department or calling 112 will cost 150 euro. All cost would be reimbursed by you insurance company.

Direct GP appointment next morning.

It is possible to plan an appointment with your own GP for the next morning with an online tool.

Appendix B: Cases

Nonurgent cases

Swallow marble

Your three-year-old child swallowed a marble. Your child does not mention to be in pain, is not nauseous, and does not cough. Your child does not have a background of medical problems, nor use any medicine. It is Saturday afternoon and your own GP is not available.

Earache

Your child is 4 years old and has had an earache since last night. Your child does not have fever, is conscious and alert, but has a cold (coughs and a runny nose). Your child does not have any other health problems and has a temperature of 36,7°C. It is Wednesday evening, 20.00 h and you cannot reach your own GP anymore.

Urgent cases

Fever

Your child is 8 months old and has fever. Last week your child had a cold, fever and was coughing seriously. It seemed that your child got better, but the fever (39,1°C) returned. Your child drinks little and still coughs. It is Tuesday evening 19.00 h, and you cannot reach your own GP anymore.

Diarrhoea

Your 1,5 year old child has been feeling ill for the past 2 days. Your child indicates he has a stomach-ache, is vomiting and has fluid Diarrhoea. You are worried because your child drinks little and has a temperature of 38,6°C. It is unclear if your child still gets wet diapers because of the Diarrhoea. You do notice that your child has a dry mouth. Your child does not have a medical history. It is Sunday morning, and your own GP is not available.

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	2
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4
Objectives	3	State specific objectives, including any prespecified hypotheses	4
Methods			
Study design	4	Present key elements of study design early in the paper	5
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	5
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	5
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	5,6
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	5,6
Bias	9	Describe any efforts to address potential sources of bias	*5,6*
Study size	10	Explain how the study size was arrived at	5
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	6
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	7
		(*b*) Describe any methods used to examine subgroups and interactions	n.a.
		(*c*) Explain how missing data were addressed	n.a.
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	n.a.
		(*e*) Describe any sensitivity analyses	n.a.
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	7
		(b) Give reasons for non-participation at each stage	n.a.
		(c) Consider use of a flow diagram	n.a.
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	7
		(b) Indicate number of participants with missing data for each variable of interest	7
Outcome data	15*	Report numbers of outcome events or summary measures	8
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	9-10
		(*b*) Report category boundaries when continuous variables were categorized	n.a.
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	n.a.
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	n.a.
Discussion			
Key results	18	Summarise key results with reference to study objectives	10
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	11
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	10-11
Generalisability	21	Discuss the generalisability (external validity) of the study results	12
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	13

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

BMJ Open

The impact of demand management strategies on parents' decision-making for out-of-hours primary care: Findings from a survey in the Netherlands

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2016-014605.R2
Article Type:	Research
Date Submitted by the Author:	22-Mar-2017
Complete List of Authors:	Giesen, Marie-Jeanne; Radboud university medical center, Radboud Institute for Health Sciences, Scientific Center for Quality of Healthcare; Tilburg University, TiasNimbas Business School Keizer , E ; Radboud University Medical Center, Scientific Center for Quality of Healthcare; van de Pol, Julia; Radboud university medical center, Radboud Institute for Health Sciences, Scientific Center for Quality of Healthcare Knoben, Joris; Radboud University, Institute for Management Research Wensing, Michel; Radboud University Medical Centre, Radboud Institute for Health Sciences, Scientific Center for Quality of Healthcare Giesen, Paul; Radboud University Medical Centre, Radboud Institute for Health Sciences, Scientific Center for Quality of Healthcare
Primary Subject Heading:	General practice / Family practice
Secondary Subject Heading:	Emergency medicine
Keywords:	after hours care, decision making, primary health care, online advice, co-payment, demand management strategies

The impact of demand management strategies on parents' decision-making for out-of-hours primary care: Findings from a survey in the Netherlands

Marie-Jeanne Giesen[a,b], Ellen Keizer[a], Julia van de Pol[a], Joris Knoben[c], Michel Wensing[a,d], Paul Giesen[a]

[a] Radboud university medical center, Radboud Institute for Health Sciences, Scientific Center for Quality of Healthcare (IQ healthcare), P.O. Box 9101, Nijmegen, The Netherlands

[b] TiasNimbas Business School, Tilburg University, Warandelaan 2, 5037, AB, Tilburg, the Netherlands

[c] Radboud University, Institute for Management Research, P.O. Box 9102, 6500 HC, Nijmegen, The Netherlands

[d] University Hospital Heidelberg, Department of General Practice and Health Services Research, Marsilius-Arkaden, Turm West, Im Neuenheimer Feld 130.3, 69120 Heidelberg, Heidelberg, Germany

Corresponding author:

Ellen Keizer

Radboud university medical center

P.O. Box 9101, 114 IQ healthcare

6500 HB Nijmegen

The Netherlands

E-mail address: Ellen.Keizer@radboudumc.nl

Telephone number: +31 24 3619641

ABSTRACT

Objective

To explore the potential impact of demand management strategies on patient decision-making in medically nonurgent and urgent scenarios during out-of-hours for children between the age of 0 and 4 years.

Design and methods

We conducted a cross-sectional survey with paper-based case scenarios. A survey was sent to all 797 parents of children aged between 0 and 4 years from four Dutch GP practices. Four demand management strategies (co-payment, online advice, overview medical cost and GP appointment next morning) were incorporated in two medically nonurgent and two urgent case scenarios. Combining the case scenarios with the demand management strategies resulted in 16 cases (four scenarios each with four demand management strategies). Each parent randomly received a questionnaire with three different case scenarios with three different demand strategies and a baseline case scenario without a demand management strategy.

Results

The response rate was 47.4%. The strategy online advice led to more medically appropriate decision making for both nonurgent case scenarios (OR 0.26; CI 0.11-0.58) and urgent case scenarios (OR 0.16; CI 0.08-0.32). Overview of medical cost (OR 0.59; CI 0.38-0.92) and a GP appointment planned the next morning (OR 0.57; CI 0.34-0.97) had some influence on patient decisions for urgent cases, but not for nonurgent cases. Co-payment had no influence on patient decisions.

Conclusion

Online advice has the highest potential to reduce medically unnecessary use. Furthermore it enhanced safety of parents decisions on seeking help for their young children during out-of-hours primary care. Valid online information on health symptoms for patients should be promoted.

ARTICLE SUMMARY

Strengths and limitations of this study:

- The study sample was representative for the Dutch population
- Both nonurgent and urgent cases scenarios were used to test the demand management strategies
- Hypothetical situations were used to test the demand management strategies
- Only one amount of the co-payment and its effectiveness was tested

KEYWORDS

after hours care, primary health care, decision making, demand management strategies, online advice, co-payment, health services accessibility

INTRODUCTION

In the Netherlands out-of-hours primary care is provided by general practitioner cooperatives (GPCs) and is intended for urgent complaints that cannot wait until the next day [1]. However, half of the requests are medically nonurgent [2] and many of these requests can wait until office hours or can be managed with self-care. Inappropriate, nonurgent contacts affect the motivation of triage nurses and GPs, and result in a higher workload which could negatively affect the quality of out-of-hours primary care [3, 4]. Also, the cost for a consultation at the GPC are higher (about 100 euro) than for a consultation during office hours (40 euro). These costs are not directly paid by patients. Patients pay a monthly overall premium to their health insurance providers. Primary care is exempted from co-payment by patients, contrary to most other types of healthcare. GPs are looking for measures to reduce the number of patients with nonurgent complaints, such as co-payment for patients, stricter triage, and a larger role for the telephone consultation doctor [4].

To support patient decision-making on healthcare use during out-of-hours and regulate demand for primary healthcare a number of strategies could be effective. Demand management strategies are widely used in the service industry to enable effective and efficient use of capacity. When applied in healthcare, these strategies have the potential to influence the patient's perceived demand through education, financial incentives, or organisational rescheduling [4-6]. Accordingly they can reduce demand that is unlikely to improve health [5, 6] while having minimal effect on genuine, urgent cases so as not to jeopardise appropriate care. Demand management strategies are patient-targeted methods, which approach the aim to prevent overcrowding and enhance the efficiency of the healthcare system, while maintaining high standards of quality and accessibility. The main demand management strategy currently used at GPCs is telephone triage [6]. However patients continue to visit the GPC directly, or get 'through' the triage system, with nonurgent complaints. GPs see these patients with nonurgent complaints as one of the most negative aspects of the GPC system [3].

Giesen *et al.* (2009) found that, of all patient populations, parents with children between the age of 0 and 4 years most often contact the GPC with nonurgent conditions. In many of these cases, it would be more appropriate to visit the GP during daytime or apply self-care from a medical and societal perspective [7]. Previous research also showed that childhood fever does account for a large workload at GPCs [8]. Considering the potential effects of demand management strategies in healthcare, it would be valuable to explore which demand management strategies could be effective to reduce nonurgent demand at GPCs for this specific population. The objective of our study was to explore the potential impact of demand management strategies on patient decision-making in both medically nonurgent and urgent scenarios during out-of-hours for children between the age of 0 and 4 years.

METHODS

Design, setting and population

We conducted a cross-sectional survey with paper-based case scenarios. Four GP practices from both rural and urban areas in the east of the Netherlands participated. A survey was sent to all families in their patient population with children aged between 0 and 4 years (N=797). A reminder was sent two weeks after the first invitation. The study was conducted between 2013 and 2015.

Questionnaire

A questionnaire was developed over several rounds by researchers and medical professionals. The questionnaire included questions about the background of the patient (gender, age, education level, income, number of children, age oldest and youngest child), followed by questions related to the paper-based case scenarios. Two pilot studies were conducted to ensure the validity of the survey and test its user friendliness. In the first pilot study a convenience sample of individuals participated and in the second pilot study 16 patients from one GP practice participated.

Strategies

In combining the insights on demand for out-of-hours primary care with the findings from previous studies on decision-making and demand management strategies in healthcare, there are several strategies that can potentially be effective to influence the demand for GPCs[3-5, 7]. We identified the following demand management strategies to be tested in our research: co-payment, online advice, overview medical cost and direct GP appointment next morning (Appendix A).

Co-payment can be implemented via a fee that has to be paid directly by the patient. We set the fee for a GPC at 75 Euros and for the Emergency Department at 150 Euros. Online advice is based on the principle to support patients in their decision making. We presented online advice that was given by an application certified by the Dutch Society of GPs (NHG). This strategy does not limit the entry to the GPC like co-payment does, and may therefore be considered an interesting alternative to the co-payment strategy.

Another possible effective demand management strategy is to give patients insight into the cost of medical treatments. This strategy would be a midway option between the somewhat controversial co-payment and education on medical conditions via online advice. The fourth demand management strategy tested is to enable patients to make an immediate next-working-day appointment with their GP via an online scheduling system. This strategy could give patients the certainty of an appointment during office hours, and might thus reduce the probability they will contact a GPC for a health condition that is nonurgent. This strategy would

be particularly relevant to the patient group that sought the services of a GPC but were unable to reach their own GP or make an appointment during office hours [9].

Case scenarios

The case scenarios were used in an early study about telephone triage and were presented to an expert panel consisting of three triage nurses and three GPs [10]. The expert panel determined the 'reference standard' regarding the appropriate type of care. We included two nonurgent and two urgent common cases (Appendix B). The nonurgent cases were cases for which contact with the GPC (the same day) was not medically necessary and the urgent cases were cases for which contact with the GPC (the same day) was medically necessary. Combining the case scenarios selected with the demand management strategies, 16 cases were devised (four scenarios each with four demand management strategies). To test all scenario-demand strategy combinations, four questionnaires were developed. Combining the case scenarios with the demand management strategies resulted in 16 cases (four scenarios each with four demand management strategies). Each parent randomly received a questionnaire with three different case scenarios with three different demand strategies and a baseline case scenario without a demand management strategy. Due to a mistake in one of the cases in the questionnaire, we excluded the answers of 141 respondents regarding that case. The baseline case scenario was included to test how respondents would react in the different case scenarios when no demand management strategy was included.

The effects of demand management strategies on patient decision-making were verified by testing if the choices made by respondents matched the reference standard of the expert panel. To test this, we rearranged the answers into categories. The answers to the nonurgent scenarios were categorized into 'medically appropriate demand' or 'over-demand', while the answers to the urgent scenarios were categorized into 'under-demand', 'medically appropriate demand' and 'over-demand' (Table 1).

Table 1. Classification answer categories

Nonurgent scenario		
Answer category		**Classification**
1.	I would wait/ apply self-care solutions	Medically appropriate demand
2.	I would contact my General Practitioner during office hours	
3.	I would contact the General Practitioners' Cooperation	Over-demand
4.	I would visit the Emergency Department	
5.	I would call 112 (emergency line)	

Urgent scenario		
Answer category		**Classification**
1.	I would wait/ apply self-care solutions	Under-demand
2.	I would contact my General Practitioner during office hours	
3.	I would contact the General Practitioners' Cooperation	Medically appropriate demand
4.	I would visit the Emergency Department	Over-demand
5.	I would call 112 (emergency line)	

Statistical analyses

Descriptive statistics were used to describe the characteristics of the respondents and the percentages of over-and under-demand for each strategy. The choices of the parents (with either over- or under-demand coded as '1' and the other choices as '0') have been tested in two separate logistic regression analyses at the case level. The answers to the baseline case scenarios served as a reference category, meaning that both nonurgent and urgent scenarios presented with demand management strategies have been tested against answers given for the baseline scenarios. We corrected for patient characteristics (gender, age, amount of children, education level and income), and added the variable GP practice to account for clustering of patients within GP practices. Analyses were performed in SPSS 22.0.

RESULTS

Characteristics of respondents

The response rate was 47.3% (N=377), providing answers to 1367 cases. Of the respondents 42.5% lived in urban areas, 17% in suburban areas and 40.6% in rural areas (Table 2). Most of the participants finished tertiary school (41.6%) and indicated their income as similar to the average Dutch household income (34.5%) [11]. The average number of children per parent was 2.1. The mean age of the oldest child was 4.8 years and of the youngest child 1.7 years.

Table 2. Characteristics of respondents (N=377)

	%	N		%	N
Gender parent			**Area**		
Female	86.7	327	Rural area	40.6	153
Male	13.3	50	Suburban area	17.0	64
			Urban area	42.5	160
Age parent					
17 – 22	2.1	8	**Number of children**		
23 – 27	13.5	51	1	30.0	113
28 – 32	30.8	116	2	45.4	171
33 – 37	30.5	115	3	16.4	62
38 – 42	17.0	64	4	4.8	18
43 – 48	4.8	18	≥ 5	3.0	13
Missing	1.3	5	(Mean = 2.1)		
Education			**Age youngest child**		
No education	0.5	2	0	14.6	55
Primary school	2.4	9	1	15.1	57
Lower secondary education	11.7	44	2	21.8	82
Intermediate vocational education	41.6	157	3	13.5	51
Higher secondary education	8.0	30	4	4.2	16
Higher vocational education	25.2	95	Missing	30.8	116
University degree	9.3	35	(Mean = 1.7)		
Missing	1.3	5			
			Age oldest child		
Family Income			0 to 4	52.8	199
> € 56800	34.2	129	5 to 9	38.2	144
About € 56800	34.5	130	10 to 14	7.2	27
< € 56800	27.6	104	15 to 21	1.9	7
Missing	3.7	14	(Mean = 4.8)		

Case scenarios

Regarding the nonurgent scenarios, 41.7% of the parents made an over-demand choice [Table 3). For the urgent scenarios 50.3% of the respondents made an under-demand choice and 3.9% an over-demand choice.

Table 3. Under- and over-demand for case scenarios at baseline (N=371)

	Over-demand chosen		Medically appropriate demand chosen		Under-demand chosen	
Scenario	%	N	%	N	%	N
Total nonurgent scenarios	**41.7**	**90**	**58.3**	**126**	**0.0**	**0**
Swallow marble	*78.2*	*79*	*21.8*	*22*	*0.0*	*0*
Earache	*9.6*	*11*	*90.4*	*104*	*0.0*	*0*
Total urgent scenarios	**3.9**	**6**	**50.3**	**78**	**45.8**	**71**
Fever	*1.2*	*1*	*79.0*	*64*	*19.8*	*16*
Diarrhoea	*6.8*	*5*	*18.9*	*14*	*74.3*	*55*

Case scenarios with demand management strategies

Overall, the percentage of parents that made an over-demand choice for the nonurgent case scenarios without a demand management strategy was 41.7% (Table 4). By providing the strategy 'online advice' the percentage of over-demand decreased by 30.4%. The strategy 'co-payment' was found to reduce the probability of over-demand to 31.7%, realizing a decrease of 10.0% compared to the baseline strategy. We did not find large differences when the strategies 'GP consult planned' and 'overview of medical cost' were used

An under-demand solution for the urgent case scenarios without a demand strategy ('baseline') was chosen by 50.3%. When using the strategy 'online advice' 16.5% chose an under-demand solution, a decrease of 33.8%. The strategy 'overview medical cost' reduced the probability of under by 10.9%. With the use of the strategy 'GP consult planned', the probability of an under-demand decision was decreased ~~of~~ by 9.7%. The strategy 'co-payment' seems to have no influence since with this strategy 50.0% still chose an under-demand solution.

Table 4. Over- and under-demand for each demand management strategy (%)

	Over-demand for nonurgent case scenarios (N=609)		Under-demand for urgent case scenarios (N=752)	
	%	N	%	N
Baseline strategy	**41.7**	**90**	**50.3**	**78**
Online advice	11.3	8	16.5	15
Co-payment	31.7	39	50.0	88
GP consult planned	44.4	48	41.0	50
Overview medical cost	35.2	32	39.4	82

Influence of demand management strategies on nonurgent and urgent case scenarios

Table 5 shows that when the strategy 'online advice' was used for nonurgent cases, parents more frequently made a medically appropriate healthcare choice (OR 0.26; CI 0.11-0.58). The other strategies had no influence on the parents' decisions in nonurgent cases. We also found that parents with more than one child made an appropriate choice more often than parents with just one child (OR 0.64; CI 0.43-0.96).

For the urgent cases, we found that the application of online advice influences parent decision-making positively, resulting in more medically appropriate choices (OR 0.16; CI 0.08-0.32). The strategy of showing the medical cost of a visit to the GPC also results in more medically appropriate choice behaviour (OR 0.59; CI 0.38-0.92), as did the strategy of offering the patient the option to plan a medical consultation with the GP (OR 0.57; CI 0.34-0.97). Furthermore, parents with more than one child more frequently chose an under-demand solution for a high-urgent condition (OR 2.04; CI 1.39-2.98) and similarly older parents more regularly chose an under-demand solution (OR 0.95; CI 0.92-0.98).

Table 5. Logistic regression for over-demand and under-demand[1]

	Over-demand for nonurgent case scenarios (N=591)		Under-demand for urgent case scenarios (N=734)	
Variables	OR	95% CI	OR	95% CI
Strategy: Online advice	**0.26**	**0.11-0.58***	**0.16**	**0.08-0.32***
Strategy: Co-payment	0.62	0.38-1.03	0.84	0.53-1.33
Strategy: GP consult planned	0.81	0.49-1.35	**0.57**	**0.34-0.97***
Strategy: Overview medical cost	0.97	0.56-1.70	**0.59**	**0.38-0.92***
Gender parent: male	0.91	0.52-1.57	0.69	0.42-1.15
Age parents	1.01	0.97-1.05	**0.95**	**0.92-0.98***
> 1 child	**0.64**	**0.43-0.96***	**2.04**	**1.39-2.98***
Highly educated	1.07	0.71-1.63	0.93	0.64-1.35
High income	1.07	0.71-1.63	0.94	0.65-1.37

[1] GP practice was added to account for clustering of patients within GP practices

OR = Odds Ratio; CI = Confidence Interval

*P<0.05, in bold

DISCUSSION AND CONCLUSION

Discussion

The findings of this study imply that decisions on healthcare seeking by parents of young children can be influenced. For both nonurgent and urgent case scenarios, about half of the parents did not chose the most medically appropriate decision. Demand management strategies have the potential to help patients make medically appropriate decisions. The strategy 'online advice' seems to have the highest potential to positively influence patient demand as it influenced decisions in both urgent and nonurgent cases. The use of this strategy has both the potential of reducing medically unnecessary use of the GPC and could also enhance safety in healthcare, as patients are more likely to contact a doctor in urgent cases. Comparable results have been found in studies on the management of chronic diseases such as depression and lower back pain [12-14]. In the questionnaire a relatively customized advice (applicable to the specific condition) was presented, and it was mentioned that the advice was given by an online application certified by the Dutch Society of GPs (NHG). This set-up of posting a 'certified' and customized advice might have had a positive influence on the patients' willingness to follow it. This is also mentioned by parents in a British study about information needs of parents for acute childhood illness [15]. In addition, the capabilities of the person receiving the advice, also influences the way a person acts upon it.

Even though 9 in 10 inhabitants in the Netherlands access the internet every day, it is still debatable whether all would actually use an online application if they would be worried or panicking about their (child's) condition. Also, it is essential to remain vigilant to how access limitations might exclude certain groups of society from accessing such information. A recent study shows that people that are older, have a higher income or live in rural areas are less likely to use mobile health applications [16]. On the other hand, access to internet on smart phones or notebooks is also high in socially deprived populations.

We also found that implementing co-payment or giving an overview of the medical cost did not affect patient decision making for nonurgent scenarios. In addition, for the urgent case scenarios there was no influence from implementing co-payment, which would imply that it does not affect patient safety. Other studies also found that co-payment was not an important driver for patient decision making [17, 18], but other studies found some effects of co-payment. A study at the Emergency Department showed a reduction in demand from patients with nonurgent conditions [19]. In line with this outcome, some argue that co-payment stimulates patients to consider whether they really need healthcare at that moment. This would eventually contribute to lowering collective healthcare costs [20]. On the other hand, critics argue that the fee could deter patients with serious illnesses from visiting the Emergency Department [21] and could lead to greater inequity, especially for socially deprived patients [22, 23].

While we expected the 'GP consult planned' demand management strategy to affect the nonurgent cases, it only appeared to affect patient decision making positively in relation to urgent conditions. Seemingly those seeking help for a nonurgent problem are not easily influenced by an organizational strategy.

Regarding patient characteristics, we found that patients with more children seem to make more under-demand healthcare choices, resulting in less over-demand. A possible explanation is that these parents, due to experience, are less prone to panic. Interestingly, they seem more likely to underestimate medical urgencies. Also, the probability that parents will choose an under-demand solution increases when a parent is older, we could philosophize that older parents are more able to assess a healthcare problem.

Strengths and weaknesses and recommendations for further research

The selected sample is diverse in terms of residential zones, income, education, age and number of children. These characteristics reflect the Dutch population.[2] We chose to use written case scenarios. A drawback of this design is that respondents were confronted with hypothetical situations, consequently emotional reactions or actual financial payments that occur in a real-life situations are not completely reflected in this research. Besides, it is possible that the respondents were eager to answer 'correctly', especially for the cases in which the strategy online advice was incorporated as they were provided with information about the appropriate response. This may have inflated the effect of this strategy. On the other hand, the information scenario was closer to reality (responders actually received it), which have enhanced the impact of this strategy. Prospective evaluation studies of demand management strategies, ideally designed as randomized trials, are required to examine their impact.

We used two nonurgent and two urgent case scenarios to test the demand management strategies. Although the cases were validated by an expert panel and they had consensus about the appropriate choice, we saw great differences in answers between the two urgent cases. We noticed that many parents chose an under-demand solution for one of the urgent cases (child with fever). In hindsight, since we did not expect such a high percentage of parents to make an under-demand choice for the urgent case scenarios (especially for the child with fever case), this case may not have been the best scenario to test the demand management strategies. Further research using more, alternate case scenarios is needed to confirm the results of this study.

There might be a relation to the amount of the co-payment and its effectiveness.[4] In this research we only tested one amount for the GPC, but if policymakers would want a more conclusive assessment of this strategy, different amounts should be tested. Finally, although the described strategies were merely effective under either urgent or nonurgent conditions, it would be interesting to research the effects of implementing strategies simultaneously. For example, combining online advice and online overview of medical cost could possibly increase the effectiveness of the strategies.

Conclusion

We conclude that there are demand management strategies which can influence a patient's ability to make medically appropriate healthcare choices for urgent and nonurgent conditions during out-of-hours. Guiding and advising patients online appears to have high potential, as it influences patient decision-making positively in both urgent and nonurgent conditions. Advising patients on what decision to take when a health condition occurs offers the patients a level of certainty that can positively influence their decision-making. Further research with more case scenarios is needed to confirm the results of this study. It is also necessary to study the impact of this strategy on patient safety in practice.

Practice Implications

Our study can have broad implications in a world where more people use the internet and policy makers are struggling to limit healthcare costs while maintaining high quality and safety in healthcare. This research shows the great potential of online health applications and we believe that an independent, certified and customized tool, such as thuisarts.nl [24], should be promoted. It may lead to a reduction in the use of GPCs for nonurgent complaints that could wait until the next day and to safer use for patients with urgent complaints.

ACKNOWLEDGEMENTS

We would like to thank all the GP practices who participated in this research.

FUNDING

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

COMPETING INTERESEST

All authors have completed the ICMJE uniform disclosure form at www.icmje.org/coi_disclosure.pdf and declare: no support from any organisation for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous three years; no other relationships or activities that could appear to have influenced the submitted work.

ETHICS APPROVAL

The research ethics committee of the Radboud university medical center (CMO Arnhem-Nijmegen) was consulted and concluded that the study does not fall within the remit of the Medical Research Involving Human Subjects Act (WMO)(file number: 2016/2870).

DATA SHARING STATEMENT

The dataset will be available on request.

AUTHORS CONTRIBUTIONS

MJG designed the study, gathered the data, participated in performing the statistical analyses, interpreted the data and drafted the manuscript. EK designed the study, participated in performing the statistical analyses, interpreted the data and drafted the manuscript. JP helped to gather data, participated in the interpretation of the data and drafted the manuscript. JK designed the study, performed the statistical analyses and revised the manuscript critically. MW participated in the interpretation of the data and revised the manuscript critically for important intellectual content. PG designed the study, participated in the interpretation of the data and revised the manuscript critically. All authors read and approved the final manuscript.

REFERENCES

1. Giesen P, Smits M, Huibers L, et al. Quality of after-hours primary care in the Netherlands: a narrative review. *Ann Intern Med* 2011;155(2):108-13.
2. Ineen. Benchmarkbulletin huisartsenposten 2014 [Benchmark report GP cooperatives 2014]. 2015.
3. Smits M, Keizer E, Huibers L, et al. GPs' experiences with out-of-hours GP cooperatives: a survey study from the Netherlands. *Eur J Gen Pract* 2014;20(3):196-201.
4. Keizer E, Maassen I, Smits M, et al. Reducing the use of out-of-hours primary care services: A survey among Dutch general practitioners. *Eur J Gen Pract* 2016;22(3):189-95.
5. Vickery DM, Lynch WD. Demand management: enabling patients to use medical care appropriately. *J Occup Environ Med* 1995;37(5):551-7.
6. Bryant CD. Demand management and case management: a conservation strategy. *Prof Case Manag* 2007;12(5):272-80; quiz 81-2.
7. Giesen P, Hammink A, Mulders A, et al. Te snel naar de huisartsenpost [Too easy to go to the GP cooperative]. *Medisch contact* 2009;06:239-42.
8. de Bont EG, Lepot JM, Hendrix DA, et al. Workload and management of childhood fever at general practice out-of-hours care: an observational cohort study. *BMJ Open* 2015;5(5):e007365.
9. Smits M, Peters Y, Broers S, et al. Association between general practice characteristics and use of out-of-hours GP cooperatives. *BMC Fam Pract* 2015;16(52).
10. Smits M, Hanssen S, Huibers L, et al. Telephone triage in general practices: A written case scenario study in the Netherlands. *Scand J Prim Health Care* 2016;34(1):28-36.
11. Centraal Bureau voor de Statistiek [Statistics Netherlands]. Gemiddeld inkomen; particuliere huishoudens naar diverse kenmerken [Average income; private households to various characteristics]. [http://statline.cbs.nl/Statweb/publication/?DM=SLNL&PA=70843NED&D1=4&D2=0&D3=0-4&D4=11-14&VW=T]. Accessed 26-09-2016.
12. Andersson G, Cuijpers P. Internet-based and other computerized psychological treatments for adult depression: a meta-analysis. *Cogn Behav Ther* 2009;38(4):196-205.
13. Berger T, Hammerli K, Gubser N, et al. Internet-based treatment of depression: a randomized controlled trial comparing guided with unguided self-help. *Cogn Behav Ther* 2011;40(4):251-66.
14. Buhrman M, Faltenhag S, Strom L, et al. Controlled trial of Internet-based treatment with telephone support for chronic back pain. *Pain* 2004;111(3):368-77.

15. Jones CH, Neill S, Lakhanpaul M, et al. Information needs of parents for acute childhood illness: determining 'what, how, where and when' of safety netting using a qualitative exploration with parents and clinicians. *BMJ Open* 2014;4(1):e003874.
16. Bhuyan SS, Lu N, Chandak A, et al. Use of Mobile Health Applications for Health-Seeking Behavior Among US Adults. *J Med Syst* 2016;40(6):153.
17. de Valk J, Taal EM, Nijhoff MS, et al. Self-referred patients at the Emergency Department: patient characteristics, motivations, and willingness to make a copayment. *Int J Emerg Med* 2014;7(30).
18. Philips H, Remmen R, De Paepe P, et al. Use of out-of-hours services: the patient's point of view on co-payment a mixed methods approach. *Acta Clin Belg* 2013;68(1):1-8.
19. Reitsma-van Rooijen M, Jong de J. Betalen voor de SEH schrikt af [Paying for the emergency department scares]. *Medisch contact* 2010;65(29-30):1479-81.
20. Robinson R. User charges for health care. In: Mossialos E, Dixon A, Figueras J, et al., eds. Critical challenges for health care reform in Europe. Buckingham: Open University Press, 2002.
21. Hsu J, Price M, Brand R, et al. Cost-sharing for emergency care and unfavorable clinical events: findings from the safety and financial ramifications of ED copayments study. *Health Serv Res* 2006;41(5):1801-20.
22. Lostao L, Regidor E, Geyer S, et al. Patient cost sharing and social inequalities in access to health care in three western European countries. *Soc Sci Med* 2007;65(2):367-76.
23. Kelaher M, Dunt D, Day S, et al. Effects of financial disadvantage on use and non-use of after hours care in Australia. *Health Policy* 2006;79(1):16-23.
24. Drenthen T, Beijaert RP, Jansen PW, et al. Thuisarts.nl, hoe bevalt dat? Ervaringen na 3 jaar Thuisarts.nl [What do you think of Thuisarts.nl? Experiences after 3 years of www.Thuisarts.nl]. *Ned Tijdschr Geneeskd* 2014;158:A8282.

Appendix A: Demand management strategies

Co-payment

Contacting the GPC will cost 75 euros, which will not be reimbursed by the insurance company. The cost for visiting the Emergency Department or calling 112 will be 150 euro, a fee that will also not be reimbursed by the insurance company. *

** This is an hypothetical situation, in the current situation all cost for visiting a GPC or Emergency Department are reimbursed by the insurance company for children younger than 18 years old.*

Online advice

Urgent cases

When you check the symptoms of your child online, via an App developed by the Dutch GP Association, you get the advice to contact the GPC.

Nonurgent cases

Swallow marble:

When you check the symptoms of your child online, via an App developed by the Dutch GP Association, you get the following advice:

Give your child something to drink and (if necessary) reassure your child. Check if the marble is coming with your child's stool.

Earache:

When you check the symptoms of your child online, via an App developed by the Dutch GP Association, you get the following advice:

Give your child something to drink and (if necessary) a painkiller. Reassure your child and let your child sleep.

Overview medical cost

Contacting the GPC will cost 75 euros, visiting the Emergency Department or calling 112 will cost 150 euro. All costs would be reimbursed by your insurance company.

Direct GP appointment next morning.

It is possible to plan an appointment with your own GP for the next morning with an online tool.

Appendix B: Cases

Nonurgent cases

Swallow marble

Your three-year-old child swallowed a marble. Your child does not mention to be in pain, is not nauseous, and does not cough. Your child does not have a background of medical problems, nor use any medicine. It is Saturday afternoon and your own GP is not available.

Earache

Your child is 4 years old and has had an earache since last night. Your child does not have fever, is conscious and alert, but has a cold (coughs and a runny nose). Your child does not have any other health problems and has a temperature of 36,7°C. It is Wednesday evening, 20.00 h and you cannot reach your own GP anymore.

Urgent cases

Fever

Your child is 8 months old and has fever. Last week your child had a cold, fever and was coughing seriously. It seemed that your child got better, but the fever (39,1°C) returned. Your child drinks little and still coughs. It is Tuesday evening 19.00 h, and you cannot reach your own GP anymore.

Diarrhoea

Your 1,5 year old child has been feeling ill for the past 2 days. Your child indicates he has a stomach-ache, is vomiting and has fluid diarrhoea. You are worried because your child drinks little and has a temperature of 38,6°C. It is unclear if your child still gets wet diapers because of the diarrhoea. You do notice that your child has a dry mouth. Your child does not have a medical history. It is Sunday morning, and your own GP is not available.

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	2
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4
Objectives	3	State specific objectives, including any prespecified hypotheses	4
Methods			
Study design	4	Present key elements of study design early in the paper	5
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	5
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	5
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	5,6
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	5,6
Bias	9	Describe any efforts to address potential sources of bias	*5,6*
Study size	10	Explain how the study size was arrived at	5
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	6
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	7
		(*b*) Describe any methods used to examine subgroups and interactions	n.a.
		(*c*) Explain how missing data were addressed	n.a.
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	n.a.
		(*e*) Describe any sensitivity analyses	n.a.
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	7
		(b) Give reasons for non-participation at each stage	n.a.
		(c) Consider use of a flow diagram	n.a.
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	7
		(b) Indicate number of participants with missing data for each variable of interest	7
Outcome data	15*	Report numbers of outcome events or summary measures	8
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	9-10
		(*b*) Report category boundaries when continuous variables were categorized	n.a.
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	n.a.
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	n.a.
Discussion			
Key results	18	Summarise key results with reference to study objectives	10
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	11
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	10-11
Generalisability	21	Discuss the generalisability (external validity) of the study results	12
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	13

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

Correction: The impact of demand management strategies on parents' decision-making for out-of-hours primary care: Findings from a survey in the Netherlands

Giesen M, Keizer E, van de Pol J, *et al*. The impact of demand management strategies on parents' decision-making for out-of-hours primary care: findings from a survey in The Netherlands. *BMJ Open* 2017;7:e014605. doi: 10.1136/bmjopen-2016-014605

The article has been corrected since it first published. 'CI' has been changed to '95% CI' several times throughout the paper and reference 24 has been added.

BMJ Open 2017;**7**:e014605corr1. doi:10.1136/bmjopen-2016-014605corr1