Patients with asplenia and doctors’ experiences in implementing preventative measures following a novel educational intervention: a qualitative analysis

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ABSTRACT
Objective To explore patients’ with asplenia and general practitioners’ (GPs’) (1) perceptions of a novel, Health Action Process Approach (HAPA)-based, educational intervention which targets to increase adherence to post-splenectomy sepsis (PSS) prevention measures and (2) their experience in implementing prevention measures following this intervention.

Design A process evaluation conducted on average 3.5 (for patients) and 3.8 (for GPs) months after the intervention between January 2020 and April 2021 individually by means of semi-structured guideline-based telephone interviews. Data was analysed using qualitative content analysis.

Participants Volunteer subsample of N=25 patients with asplenia and N=8 GPs who received the intervention. Inclusion criteria were met by prior participation in the intervention (German-speaking, of full age and insured by the cooperating health insurance). Patient selection was done by purposive selection aiming at maximum variability in terms of adherence to preventative measures prior to intervention participation. Participating GPs are a non-purposeful selected convenience sample. For reasons of data protection, no personal data was collected.

Results The intervention was positively evaluated and its personal relevancy for patients and for the GPs’ professional work became apparent. The intervention promoted risk awareness, intention to action, action planning and subsequently, improved adherence to preventative measures. Helpful factors for implementation among the patients were social support by relatives and GPs. Barriers to adherence identified in both groups can be divided into patient-attributed (eg, comorbidities), doctor-related (eg, lack of knowledge or support) as well as contextual factors (eg, vaccine supply constraints).

Conclusions Our findings indicate a patient and GP perceived benefit of the intervention, but still identify prevailing barriers to implementation. In a further step, a quantitative evaluation of the intervention will be conducted and recommendations for integrating the intervention in usual care will be made.

Trial registration number DRKS00015238.

STRENGTHS AND LIMITATIONS OF THIS STUDY
⇒ This is the first study in the field of asplenia that explores in depth patients’ and general practitioners’ (GPs) experiences in implementation of post-splenectomy sepsis preventative measures following an intervention intended to increase adherence.
⇒ Purposeful selection of patients which aimed at maximum variation regarding their preinterventional adherence enabled them to explore a sample with diverse initial experiences in preventative behaviour.
⇒ A minor limitation as regards to the intended maximum variation selection is that very high levels of adherence did not occur in the sample.
⇒ Since participation in the interview, which serves as the data basis in this study, was a voluntary additional effort, a positive bias might have been induced.

INTRODUCTION
Patients with an absent or dysfunctional spleen are susceptible to infectious diseases throughout their lives and are at an increased risk of developing a post-splenectomy sepsis (PSS; also called overwhelming post-splenectomy infection (OPSI)),1 with a mortality rate up to 50%.2 According to the international clinical guidelines, OPSI is largely preventable through prophylactic measures in this patient population.3 These measures include among others anti-pneumococcal and anti-meningococcal vaccination, permanent availability of a medical alert card and an antibiotic supply for emergency fever treatment (‘pill in the pocket’) as well as patient education.

However, there is widespread evidence that guideline awareness and adherence are low.1 Even if the doctor’s knowledge and attitude towards guidelines was found to be appropriate, patient education by health providers as well as intersectorial communication were described as insufficient.4 Thus, many patients
with asplenia have poor knowledge about the risk associated with their condition and existing prevention recommendations (i.a., 5, 7). Beyond these knowledge (transfer) gaps mainly reported in literature, barriers such as safety concerns, scepticism and the doubted need for vaccination are further reasons that were found for non-adherence of patients with asplenia. 8 As better patient knowledge can be considered a key factor in improving adherence, 9 and primary care providers are critical in patient education and prevention implementation, 8, 10 we developed a novel educational intervention for both patients with asplenia and for their general practitioners (GPs) (for a detailed description of the intervention see 11).

The intervention is a manual-based individualised telephone counselling on evidence-based information of the spleen, asplenia-related infection risks and infection prevention recommendations, conducted by an infectious diseases specialist. The Health Action Process Approach (HAPA), a framework that provides predictors for initiation and maintenance of preventative behaviour, 12 including vaccination behaviour (i.a., 15), served as a theoretical basis. Distinguished into two phases in the HAPA, these predictors include risk perception, outcome expectations and perceived task self-efficacy which influence the formation of an intention (motivational phase) as well as action and barrier coping planning and maintenance self-efficacy that lead to the actual behaviour (volitional phase). Accordingly, our intervention includes specific components which promote motivation for initiation as well as action-related strategies such as planning and managing barriers, the latter being realised through a customisable action plan for patients. For doctors, the intervention is primarily information-orientated by conveying current guideline recommendations for patients with asplenia in general and the attending patient specifically. Accompanying the telephone intervention, participants receive written information tailored both to patient and doctor, along with a plain vaccination schedule and a medical alert card.

The intervention is currently being evaluated in terms of its effectiveness in a two-armed historical control-group design. Moreover, as recommended for complex interventions, 14 the intervention was evaluated in a qualitative process evaluation. The findings of the process evaluation will be reported in the present article, the quantitative findings will be reported elsewhere. The aim of the process evaluation is to investigate how patients and doctors evaluate the intervention and how they perceive its usefulness for implementation, with particular attention to health behaviour changing factors according to HAPA. And notably, the objective is to gain a deeper understanding of the participants’ experience in implementing the preventative measures post intervention, including factors that influence adherence, that are subjectively perceived barriers as well as helpful factors.

METHODS

Study design
This is a qualitative interview-study conducted with patients with asplenia and attending GPs. To ensure the reliability and rigour of our results the methods and the findings are presented in accordance with the CONsolidated criteria for REporting Qualitative research checklist 15 (see online supplemental file 1). The research design was based on two steps: (1) A semi-structured interview guideline according to Helfferich 16 was developed in a multistep process under comprehensive review of the whole team (see online supplemental file 2 for interview guidelines). The interviews were audio-recorded and fully transcribed by an external service provider and also anonymised in this step. (2) The content analysis was computer-assisted using MAXQDA Plus 2020 (V.20.0.3). In order to ensure the reliability and credibility of the analysis we followed the qualitative content analysis based on the approach of Kuckartz. 17

Patient and public involvement
Patients or the public were not actively involved in this research.

Participants and recruiting
The sample is a subsample of asplenic patient and doctor participants, who received the intervention and were willing to take part in an additional interview (willingness was queried after participation in the intervention on the phone). Inclusion criteria for patients were met by prior study participation (these were German-speaking, of full age and insured by the cooperating AOK health insurance; see 11). All interviewees provided written informed consent to participate, including having their interview audiotaped and further processed. They received a €30 voucher for participation. For reasons of data protection, no personal data was collected.

Patient participants
Patients were selected using a maximum variation sampling approach (purposeful sampling). A maximum variability in terms of their preinterventional study-specific ‘Preventing PSS-score’ (‘PrePSS-score’) was sought. The ‘PrePSS-score’ indicates patients’ adherence to the recommended preventative measures on a scale from 0 to 10 (anti-pneumococcal and anti-meningococcal vaccination, availability of a medical alert card and of an antibiotic supply; for details on development and calculation of the ‘PrePSS-score’ see 11), with higher scores indicating greater adherence. With this approach, we expected to explore diverse experiences in implementation as those might differ according to prevention measures taken prior to the study participation.

Selection was performed in two phases. First, all the patients who had agreed to participate were selected successively. After conducting initial N=14 interviews, further patients were purposively selected in an iterative process on the basis of so far unrepresented or
under-represented preinterventional ‘PrePSS-score’ to obtain maximum variation. Appropriate maximisation was assumed when each possible ‘PrePSS-score’ (0–10) occurred at least twice. Thus, this approach was also used to determine the minimum number of interviews necessary. Since the values 7, 9 and 10 did not occur among patients who were willing to participate, the range of variation was determined by the actual scores present for this subgroup (for exact frequencies see Table 1).

In total N=31 patients were contacted. As N=6 of them did not provide written consent (N=1 refused participation due to ongoing treatment, N=5 could not be reached), N=25 patients were interviewed. That is 22.7% of all patients (N=110) who received the intervention.

Doctor participants

Due to the low participation willingness and difficulties with accessibility (presumably in part because this study was conducted during the COVID-19-pandemic) a non-purposeful selection procedure was required for the doctors. We took a convenience sample of doctors, that is, all those who were willing to participate (N=11) were contacted for study participation. Among these, N=8 participated. The remaining N=3 participants were not reachable (N=2) or refused participation due to lack of time (N=1). Participating doctors were the GPs of any of the intervention group patients. Thus, patients and doctors were not chosen in pairs for the interviews.

Interview guideline

The semi-structured interview guidelines for patients and doctors were drafted by NA and MB following Helfferich and finalised after review by the whole study team. Marginal adjustments to improve applicability were made on mutual agreement between the interviewers after 14 patient interviews were conducted.

The interview guide for patients was divided into three obligatory main blocks on the topics; (a) ‘evaluation of the telephone intervention’ (initial question), (b) ‘experience in implementing preventative measures’ and (c) ‘dealing with sepsis risk’ and (d) a supplementary block addressing the written information material accompanying the telephone intervention. Each question block contained an open-ended obligatory core question that subsumed the key aspects of each topic. Interviewees were to be given the opportunity to freely report on their experiences, specific questions were only posed if a relevant aspect of the core topic was not proposed by the participants. The interview guide for doctors contained the topics; (a) ‘evaluation of telephone intervention’ (initial question), (b) ‘usefulness of the telephone intervention’ and (c) a question block addressing the written information material. Overall, the doctor interview guide was more information-orientated compared with the patients’ guide, and improvement suggestions were directly requested from doctors. The interview guidelines are attached in online supplemental file 2.

Table 1  Frequencies of the preinterventional ‘PrePSS-score’ of the participants

| PrePSS-score (0–10) | N  | %  |
|---------------------|----|----|
| 0                   | 1  | 4  |
| 1                   | 4  | 16 |
| 2                   | 5  | 20 |
| 3                   | 3  | 12 |
| 4                   | 4  | 16 |
| 5                   | 3  | 12 |
| 6                   | 3  | 12 |
| 7                   | 0  | 0  |
| 8                   | 2  | 8  |
| 9                   | 0  | 0  |
| 10                  | 0  | 0  |

PrePSS-score, preventing post-splenectomy sepsis-score.

Procedure and transcription

Patients and doctors were interviewed individually between January 2020 and April 2021 via telephone by MB and NA, using the developed guideline. MB and NA, both female research assistants and psychologists with experience in counselling and conversation techniques, were responsible for the development of the guidelines and the implementation and analysis of the interviews. They were also involved in the development of the manuals for the patient and doctor-directed interventions. Apart from a short telephone contact to arrange the interview date, the interviewers did not know the interviewees beforehand. They introduced themselves as part of the study team responsible for evaluating the intervention. Participants were informed that the study-doctor who conducted the telephone intervention would have no access to recordings or transcripts of individual patient interviews, but only to aggregated, pre-processed data of all the interviewees.

The interview dates were scheduled about 3 months after the telephone intervention. For practical reasons, this period between the intervention and the interview varied between 2.5 and 6.5 months (on average 3.5 months) among the patients. For the doctors, the time period varied between 2.5 and 7.3 months (on average 3.8 months). All interviews were digitally audio-taped in full. No field notes were taken during the interview. The audio recordings were transcribed verbatim by an external transcription service provider. Personal data were pseudonymised before data analysis. Neither transcripts nor results were returned to participants for feedback.

Data analysis

The transcripts of the interviews were analysed using qualitative content analysis largely based on the approach of Kuckartz, which involves both deductive and inductive coding. The chosen multilevel procedure for this study is outlined in Table 2.
Data organisation and analysis was performed using MAXQDA Plus 2020 (V.20.0.3) qualitative data analysis software. Following quantitative descriptive information was calculated using IBM SPSS Statistics (V.27). The entire patient data material to be analysed had covered a duration of about 712 min, the data material of doctors circa 148 min. The patient interviews lasted between 9 and 75 min, with an average length of 28 min; doctor interviews lasted between 7 and 30 min, on average 18 min. The interviews were conducted in German. Code descriptions and quotations taken from the interview transcripts given below are translations from German into English (tables 3 and 4).

### FINDINGS

#### Patients’ interviews

**Implementation of preventative measures**

Only few patients referred to prevention measures that had been implemented prior to study participation, with most of them indicating initial approaches and none of them indicating the full implementation of recommendations. Patients reported having already received (some or all of) the recommended initial vaccinations. These vaccinations had been administered post-splenectomy by the hospital conducting the splenectomy, after discharge by the GP, a specialist or during rehabilitation and, in two cases of elective surgery, even before the splenectomy.

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### Table 2  Levels of the qualitative content analysis

| Familiarisation stage | Before coding, the entire transcribed text material was read intensively in the process of pseudonymisation and short case summaries were composed. |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inductive–deductive development of the initial coding frame | Based on this familiarisation stage, codes were extracted inductively by NA. In a next step, additional codes were derived deductively from key topics of the interview guideline, from previous research on barriers that influence patients’ adherence to preventative measures and from the underlying theoretical Health Action Process Approach. |
| Quota sample trial phase and revision | This initial coding frame was then applied to a quota sample consisting of 20% of the data material (N=5 patient and N=2 doctor-interview transcripts), comprising interviews from both interviewers collected at various time points during data collection. In the process of this trial phase, the codes were refined several times through continuous reflection and classified into main and subcodes. |
| Entire data material trial phase and team-review | This was followed by the first coding of the entire data material along the so far defined coding frame. In this process, codes were again revised if required, for example, summarised or differentiated into further subcodes. In this process a coding guideline was formulated. To ensure intersubjective comprehensibility, the coding frame, the guideline and the coding of individual, randomly chosen interviews were critically reviewed by MB, MG and EF-G and, if needed, slightly adapted to their feedback. This resulted in the final set of 6 main codes and 11 subcodes for patients and 4 main codes and 4 sub-codes for doctors (for an overview see tables 3 and 4). |
| Application of the final coding system | This final coding system was then applied to the entire data material by NA. |
| Extraction of a code × participant-summary-matrix | In the last step, all the statements of a participant assigned to the same code were paraphrased and the overall findings were extracted from a code × participant-summary-matrix. |

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### Table 3  Final coding system of patients’ interviews

| Main codes | Subcodes |
|------------|----------|
| Implementation of preventative measures |  |
| Barriers to implementation of preventative measures |  |
| Perceptions of the intervention | Evaluation of the telephone intervention and accompanying information material |
| | Personal relevance of the intervention |
| Perceived impact and usefulness of the intervention for implementation | Implementation of preventative measures |
| | Motivation for implementation |
| | Initiation and maintenance of steps necessary for implementation |
| | Initiation and maintenance of implementation through prior planning |
| | Perceived effects of the intervention on the general practitioner |
| Infection-related risk perception following the intervention | Cognitive-affective level |
| | Behavioural level |
| Barriers and helpful factors for implementation of preventative measures following the intervention | Barriers to implementation |
| | Helpful factors: social support |
Furthermore, a few patients stated that they had already received a medical alert card for patients with asplenia from the hospital, which, however, in some cases were not filled out completely or not permanently available.

I have had only, I think, two vaccinations. And then they said that it was done. I then took the list, presented it to him and then I got the rest of the vaccinations. (ID240216)

**Barriers to implementation of preventative measures**

Regarding barriers to implement preventative measures, personal, contextual, as well as doctor-attributed factors could be found. The majority of patients mentioned their own insufficient or complete lack of knowledge about the infection risk associated with asplenia and (the need for) corresponding preventative measures. Poor relevant knowledge and failures in implementation were largely attributed to the GP, to the hospital or the rehabilitation centre (or their cooperation), with patients stating that they were either inadequately, incorrectly, incomprehensible or not at all educated and patients assumed that a lack of relevant knowledge, time or priority by the healthcare providers were the reasons.

However, the hospital staff said that everything was okay and that it was possible to live without a spleen. (ID020314)

Furthermore, comorbidity (mostly cancer) and/or the poor health condition of patients influenced measure implementation as disease-related fears and treatments gave less priority to vaccinations necessitated by the splenectomy or were the reason for their temporary contraindication. Contextual barriers included vaccine supply difficulties and vaccine costs considered not being borne by the health insurance. The results presented below refer to the intervention and to experiences following the intervention.

**Perceptions of the intervention**

**Evaluation of the telephone intervention and accompanying information material**

As regards to the evaluation of the telephone intervention, a relatively homogeneous picture emerged. Respondents experienced it as pleasant, patient-centred and some mentioned they felt taken care of. The information provided was evaluated as being informative and comprehensible (except for some of the technical terms and abbreviations used). Duration was deemed appropriate and necessary. As to the information material, patients stated they made use of it and some kept it to be able to refer to it at any time. It was rated as informative (in particular the vaccination schedule included) and comprehensible. However, some people clearly expressed the added value of the telephone intervention aligned to the written information material over only having the information material, especially when considering comprehension.

So that was pleasant for me. I could ask him questions, he calmed me down and, yes, it was understandable. (ID020314)

**Personal relevance of the intervention**

Beyond the evaluation of the telephone intervention, its personal relevancy for the participating patients became apparent. Interviewees were appreciative of having received previously unknown or incomplete disease-specific information they rated as subjectively important. They stated that their awareness of risk factors and necessary prevention was formed or increased by the (new) information and some reported they felt safer having been educated now.

And I have to say, it has also given me a sense of security. And the education was very good, because, as I said before, I had no idea […] (021310)

**Impact and usefulness of the intervention for implementation**

**Implementation of preventative measures**

All the respondents who provided information on immunisation had received the recommended vaccinations since the telephone intervention or had already planned outstanding (or booster) vaccinations. The medical alert card and the antibiotics for emergency treatment were also mostly permanently available to patients (left in the car, handbag, wallet or mobile phone case), even though there were some failures in filling the alert card in.

I have got antibiotics for emergency treatment, meantime. I always carry it with me when I go away […] I have the medical alert card with me all the time. (ID 021311)

**Motivation for implementation**

Some participants explicitly expressed that the intervention had nudged them to plan, implement or adhere to preventative measures or to demand implementation from their GP.
During a consultation following the telephone intervention, patients reported that they perceived their GPs being open to the (new) information and to study (participation). Preventative measures would have taken an unprecedented priority as most doctors supported the implementation by initiating or monitoring the process (eg, deposited study information, arranged vaccine supplies, reminders about (booster) vaccinations, or completion of the medical alert card).

So, I have the impression that he’s already got this properly on the agenda, to pursue it now and also to take it further. [...] And I attribute this to the conversation with you. (ID090709)

It has to be mentioned here, that, to the patient’s knowledge, some of the GPs had received the telephone intervention for doctors at the time of the patient interview and others had not (yet).

Infection-related risk perception following the intervention

Cognitive-affective level

Some patients indicated that they had (initially) been alarmed, concerned or anxious when receiving (largely) unfamiliar information on the asplenia-related infection and sepsis risk through the intervention. Some described being uncertain about potential risk factors and signs of sepsis as well as about whether they, in case of infection, would react properly. There were also patients who were quite optimistic and unconcerned. Some of these (as well as some of those who stated they were initially concerned) said that they felt safe and prepared to deal with the existing risk thanks to comprehensive education, as well as through preventative measures (to be) taken and knowledge of their efficacy.

Because before that, it was rather in abeyance. I just read and heard: Yes, blood poisoning, far, far greater risk. [...] However, after that [telephone intervention] it was a bit better [...] So, I don’t imagine now my hand suddenly falling off from one second to the next. (ID021012)

Behavioural level

Besides the cognitive and affective consequences of risk perception, respondents also adapted their behaviour following the intervention. Beyond implementation of the main preventative measures, patients showed precautionary behaviour (ie, avoiding crowds, keeping their distance from potentially sick people, wearing face masks, being careful about hand hygiene, avoiding injuries and, if needed, seeing a doctor sooner) or were alert for symptoms. Some interviewees made direct reference to the current COVID-19 pandemic, which probably had enhanced or induced caution.

I’m also paying more attention to myself now, even more. And I check every day, is there anything that doesn’t belong there? This line or am I warm and have high temperature, [...] (ID120714)

Barriers and helpful factors for implementation following the intervention

Barriers to implementation

For implementation of the targeted preventative measures following the intervention, again personal, contextual as well as doctor-attributed barriers were depicted. The most common personal reason for delayed or prolonged implementation of (booster) inoculations was comorbidity (ongoing chemotherapy or immune treatment), less often mentioned was the personal refusal of the influenza vaccination. Doctor-attributed barriers were poor support in initiating and administering vaccinations, inadequate education about side effects by or confusion about the vaccination sequence. Other barriers were vaccine supply shortages, difficulties in appointment availability and coordination and, in one case, vaccination costs that were assumed to not be covered by the health insurance.

Perceived effects of the intervention on the GP

During a consultation following the telephone intervention, patients reported that they perceived their GPs being open to the (new) information and to study (participation). Preventative measures would have taken an unprecedented priority as most doctors supported the implementation by initiating or monitoring the process (eg, deposited study information, arranged vaccine supplies, reminders about (booster) vaccinations, or completion of the medical alert card).

So, I have the impression that he’s already got this properly on the agenda, to pursue it now and also to take it further. [...] And I attribute this to the conversation with you. (ID090709)

It has to be mentioned here, that, to the patient’s knowledge, some of the GPs had received the telephone intervention for doctors at the time of the patient interview and others had not (yet).
Concerning the medical alert card, a few interviewees stated that they were not able to complete it themselves, with some GPs refusing to help. One patient expressed discomfort at having to manage and carry several (vaccination attesting) documents.

What I found a pity was that I often presented the medical alert card to my doctor, to my family doctor, but they didn’t want it at all… in fact, they didn’t even look at it. (ID041710)

Reasons for not having antibiotics available for emergency treatment were lacking (patient or doctor) conviction or knowledge of individual need, as well as lack of cooperation of the GP. In another case, a patient criticised that her GP did not educate her about the use (including dosage) of the prescribed antibiotic.

**Helpful factors: social support**

A good relationship, experienced general support, as well as professional advice and care by the GP (and the GP coworkers) were mentioned as a helpful factor in prevention implementation and in coping with their condition by many interviewees. Among other things, it seemed to be of great significance for patients to be able to rely on their GP for (prospective) measure implementation. A large proportion also felt supported emotionally and in prevention implementation by their relatives (thanks to accompaniment to doctor’s appointments, eg). Some subjects actively involved family members (in one case also colleagues) by informing them about the disease specifics and preventative measures necessary or already taken (eg, depository of emergency antibiotic supply).

My husband also knows about it. Yes, of course, I told him all this too. And he has read everything that he has received. He is also always with me at the doctor. (ID120714)

**Doctors’ views**

**Barriers to implementation of preventative measures**

For implementation of the preventative measures prior to study participation, interviewed doctors mentioned both doctor (ie, own) and healthcare system-related barriers as well as patient-attributed barriers. Most notably, interviewees described their own knowledge gaps or uncertainties when it comes to asplenia-specific risks, updated vaccination recommendations or the necessity of an antibiotic prophylaxis and some made reference to their minimal routine in the treatment of this patient group. Furthermore, two doctors described deficits at the hospital-outpatient care interface, on the part of the hospital (eg, misleading information in the discharge letter, lack of raising patients awareness of further outpatient care by GP) as well as their own lack of awareness and assumed patient’s failures.

And that is my mistake, the patient’s mistake, and at the same time the [name of hospital]’s mistake is also present, a hundred percent. All the stops have not been pulled out properly. (ID072212)

**Perceptions of the intervention**

**Evaluation of the telephone intervention and accompanying information material**

The intervention was overall positively evaluated by all the GPs interviewed. The telephone based intervention was viewed as pleasant, instructive and individually-adapted to prior knowledge and the attending patient. The duration of the phone call was viewed as appropriate. Accompanying information material was mostly used and/or deposited for future recourse, content was evaluated as helpful and the scope (with one exception) as adequate. Still, all the GPs gave preference to the telephone consulting over only written information material (in terms of raising awareness and the opportunity to discuss aspects in depth).

O.k., I found it pleasant, very informative and very individual. He was very responsive to my previous knowledge, I had also read something before. (ID050610)

**Relevance of the intervention for own professional work**

Beyond formal evaluation, the GPs addressed the effect of the intervention for their work. They stated that they received subjectively new or updated information on asplenic preventative care, classified as reliable (expert knowledge) and helpful for the treatment of their patients. Besides knowledge (reactivation), they mentioned increased attention to their (further) patients affected and their own responsibility in implementing and monitoring (eg, when it comes to booster vaccinations, periodic renewal of antibiotic prescriptions) the precautions.

So we already knew what we had to do in case of asplenia, but we still hadn’t had it on our minds that much. (ID042812)

**Impact and usefulness of the intervention for implementation**

**Implementation of preventative measures**

GPs mentioned preventative measures already implemented or ongoing, mostly in terms of vaccinations. Since the systematic record of their factual implementation was not the aim of these interviews, but rather the experience of it, corresponding responses remained quite vague and rare.

So she got the medical alert card from you, and, I think I gave her a prescription for the stand-by antibiotic right away. (ID072212)

**Perceived impact on further medical action**

Besides implementation of the measures themselves, GPs also named heterogeneous other consequences for their work. For instance, adoption of vaccination schedules and templates for doctor’s letters, storing of patients’
asplenia-specific information in the internal system, targeted summoning and broader education of affected patients as well as a more extensive diagnostic work-up in the case of infections.

When infections occur I become alert and I immediately think, should I treat it with antibiotics now, maybe I need to do a bit more diagnostics than usual? (ID050610)

Barriers to implementation of preventative measures following the intervention

As regards to the implementation of the preventative measures following the intervention, doctors (ie, own), healthcare system-related and patient-attributed barriers as well as contextual factors were described by interviewed GPs. Doctor-attributed barriers to vaccination were lack of clarity in the case of concurrent other treatment (eg, chemotherapy) and inconsistencies in the vaccination sequence originating from the hospital. At the patient level, comorbid diseases and poor health as well as associated uncertainties posed an obstacle (eg, refusing immunisation during chemotherapy out of fear). Furthermore, GPs stated vaccination delays due to delivery constraints and named an extra effort of parallel vaccination documentation (medical alert card for asplenia and vaccination certificate).

Yes, she suddenly got metastases, she has to have chemotherapy again and so she has insisted that she doesn’t get any vaccinations. But that would have all worked out, because I would have had her vaccinated earlier if I had gotten the vaccine. (ID072213)

DISCUSSION

This study explored perceptions of patients with asplenia and GPs of a novel intervention aiming to increase adherence to PSS prevention measures and their experiences in implementation following this intervention by means of a process evaluation. In our sample there were no participants whose answers deviated strongly from the general result. The results of both participant groups therefore provide a relatively homogeneous picture and will be discussed conjointly in the following.

The intervention was overall positively evaluated by both patients and GPs. This referred to the intervention framework, comprehensiveness and informative value as well as to its recipient-centredness, with the telephone based part of the intervention outweighing the written information material provided. Furthermore, the intervention seemed to have a great personal relevance for patients and for the attending doctors’ professional work. Both groups reported newly emerged or increased subjective relevant knowledge. This was linked to a sense of security of being well informed in one’s own matters on the part of the patients while GPs mentioned an increased sense of responsibility in the implementation of precautions and several practical implications in the management of patients with asplenia.

Even though barriers to initial adherence were not an intended focus of the interviews, most participants referred to it. Both similarities and deviations from relevant studies could be found. Corresponding to previously reported studies, poor relevant patient knowledge were found. Furthermore, comorbid diseases influenced feasibility of the measures, as well as deficits in intersectorial communication, the latter also being identified as a key barrier for doctor guideline-conform patient management. However, in comparison to Di Sabatino et al, who described concerns of patients with asplenia about the safety of vaccination or scepticism about its benefits as barriers to vaccine prophylaxis, these aspects were not detectable in our interviews.

The intervention, which was theoretically based on the HAPA, seemed to be an appropriate strategy to promote intention to action, action planning and subsequently, to improve adherence to prevention measures of patients with asplenia. Patients claimed that they developed risk awareness, were convinced and felt motivated and empowered to plan and implement preventive measures or demand their initiation from their GPs. It can be suggested that patients demonstrated self-management behaviour, they presumably did not show before. Risk awareness was manifested on the cognitive-affective level with a tendency of increased anxiousness and mental preoccupation or realistic risk estimation and self-efficacy, as well as in increased health precautionary behaviour and alertness for infection symptoms. Overall, the results indicate that the targeted prevention measures were mostly implemented appropriately and in full following the intervention. Subject to the pending quantitative evaluation, we thus have initial indications that our findings fit in with other research showing the feasibility of HAPA-based interventions in the context of prevention behaviour (i.a. 15).

Our results depict helpful factors and barriers to implementation. As far as helpful factors are concerned, patients alluded to the social support of their GPs, as well as through relatives. Patient and GP reported barriers can be divided into patient-attributed, doctor and contextual or healthcare system-related factors. Reasons for prolonged or missed vaccination were comorbidities and related treatments (eg, chemotherapy) and, very rarely addressed, a patient’s personal refusal. Lack of knowledge, support and education on the part of the GPs were also negatively contributing factors. Other reasons were at a contextual level, for example, vaccine supply constraints, lack of appointment availability or, brought in by GPs, cooperation deficits between hospital and outpatient care. Since the intervention aimed to address evidenced barriers, it corresponds with the expectation that in the overall picture, these were disease-related or structurally given barriers,
which could not be addressed by the intervention (eg, vaccine availability), that would emerge. Therefore, the qualitative study enabled us to go beyond the factors addressed in the quantitative part of the study and take context factors into account, which could be included in future intervention studies and in the actual implementation of the intervention.

The interpretation of all the results must be done bearing in mind that selection bias cannot be ruled out. As participation in the interviews was a voluntary additional effort, participating patients and GPs might be a certain subgroup of study participants who tend to be motivated or in favour of the intervention and thus may have induced a positive bias in terms of intervention evaluation and reported implementation. Furthermore, selection might have influenced patient-reported barriers (eg, mostly action-related, rather than personal attitudes opposing prevention measures). Although the patient selection was purposefully aiming at maximum variation regarding their preinterventional adherence (‘PrePSS-score’), it must be further mentioned that very high levels of the PrePSS-score did not occur at all in the sample. However, we argue that this is less severe, as it represents exactly those patients who are the target group of our intervention, as the intervention is not urgent for patients with high adherence scores. Beyond that, it should generally be noted that the prompting of certain issues during the guideline-based interview might have narrowed or limited the answers given.

In conclusion, our findings reveal a positive evaluation and a patient and GP perceived benefit of the theory-based intervention, thus fulfilling one requirement for a successful implementation of the intervention. In a next step, the quantitative evaluation of the intervention will be conducted and recommendations for implementation in usual care will be made on the basis of the overall evaluation. In the final stage of the project it is planned to provide the relevant information via our website, congress presentations and publications to GPs and health insurers to encourage them to implement this successful intervention in real healthcare settings.

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