Associations of an Easy-to-Understand Patient Letter on the Health Literacy of Patients after Discharge from Hospital: Results of a Randomized Controlled Intervention Study

Assoziationen eines leicht verständlichen Patientenbriefs zur Gesundheitskompetenz nachstationärer Patienten. Ergebnisse einer randomisiert kontrollierten Interventionsstudie

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ABSTRACT
Background 54 % of the German population has limited health literacy, which is associated with poorer health outcomes and higher utilization of the healthcare system.

Aim of the study The aim of this pilot study was to examine the effects of an easy-to-understand patient letter on patients’ health literacy after discharge from a Clinic for Internal Medicine and to analyze patients’ need for written, easy-to-understand information.

Method In a randomized controlled trial (2016–2018), the effects of the patient letter on health literacy were examined by means of the HLS-EU-Q47 questionnaire. The intervention group (IG, n = 242) received an easy-to-understand patient letter 3 days after discharge, the control group (KG, n = 175) received only the usual medical discharge letter.

Results 60 % of post-discharge patients were found to have limited health literacy. The study could not show any effect of patient letters on overall health literacy. The analysis of single items of health literacy showed positive effects of these letters on patients’ comprehension of medical advice as well as their understanding and implementation of medication instructions (Cohen’s d ≥ 0.20). Furthermore, patients expressed their wish for information after discharge from hospital (99 %) and rated the patient letter as informative, understandable and helpful.

Conclusions Patients wish to receive and are empowered by an easy-to-understand letter after discharge from hospital with medical information and medical instructions that they can implement at home.

ZUSAMMENFASSUNG
Hintergrund 54 % der deutschen Bevölkerung verfügt über eine eingeschränkte Gesundheitskompetenz. Eingeschränkte Gesundheitskompetenz ist assoziiert mit schlechteren Gesund-
Background

Health literacy is a complex, relational and multidimensional construct [1]. It includes the knowledge, motivation and competence to find, understand, assess and apply health-related information. These competencies are necessary to make decisions in the areas of disease management, prevention and health promotion [1–3]. Health literacy not only takes into account personal resources, but is also context-dependent [4, 5] and should therefore be understood as an interplay of the • skills and abilities of a person (personal health literacy) and • the respective demands placed on an individual in the respective systems and organisations in which they reside (systemic/organisational health literacy) [4–8].

The more complex these systems are, the higher the demands on the person who navigates in this system and has to make health decisions. Organisational health literacy thus reduces the demands in the respective contexts placed on individuals by the health system.

This comprehensive understanding should be taken into account when developing measures to promote health literacy. These should not only focus on strengthening personal competencies and skills, but also on improving the respective design of situational requirements and contextual factors [4, 7]. One example to address these factors is adapting information to patient needs through communication that is understandable to the patient. Nevertheless, evidence shows that patients often are dissatisfied with the communication in the conventional discharge letters and have problems in processing the information it contains [9]. Thus 54.3% of the population in Germany have considerable difficulties in dealing with health-related information [3]. The so-called patient letter is an approach to bridge the communication gap between patients and doctors. It was initiated by the “Was hab’ ich?” gGmbH (What do I have? non-profit company) that aims to improve doctor-patient communication by offering patients the opportunity to have their medical findings “translated” into easy to understand language.

In the following, we report on the piloting of an easy-to-understand patient letter after an inpatient stay. The article explores the acceptance of the patient letter, potential differences between intervention group and control group and makes first considerations about the implementation of the patient letter. This article focuses on the questions, 1. how patients assess their health literacy after hospitalisation, 2. how the patient letter is associated with the health literacy of the patients, 3. how the patient letter is evaluated by the patients and 4. what information is needed after discharge from hospital.

Methodology

Study design

The randomised controlled pilot study was conducted from 06/2016 to 04/2018. Patients of the Department of Internal Medicine of Paracelsus-Klinik Bad Ems who were undergoing inpatient treatment during the study period were recruited. All planned patients with sufficient German language skills were included, while multiple hospital stays during the study period were an exclusion criterion. Recruited patients were randomly assigned to the intervention group (IG) or control group (KG) in a consecutive sampling. Due to the lack of intervention studies on health literacy in Germany at the time of the study, the sample size calculation was based on a previous study investigating the effects of a patient letter on adherence to treatment (Quelle). Based on an effect size of $d = 3$ (two-sided t-test), a confidence interval of 95%, and a power of 0.8, a minimum case number of 176 participants per group was targeted.

Intervention

The conventional discharge letters of the study participants, written by hospital doctors, were transmitted digitally and in compliance with data protection regulations to “Was hab’ ich?” The medical staff of the non-profit company translated the discharge letters into language that is easy for patients to understand. Each of the
translated patient letters included individual information about the reason for admission, the course of the clinic, the clinical picture, examinations carried out, prescribed medication and its effect, cardiovascular risk factors and health-promoting behaviour of the patient.

Data collection
Patients of the IG received the easy-to-understand patient letter by post approximately three days after inpatient discharge from the hospital in addition to the conventional discharge letter. Patients in the KG group only received the conventional discharge letter on discharge. The study questionnaire was sent by post to the patients about three days after sending the patient letter (IG) or after discharge (KG).

Measuring instrument
In addition to the socio-demographic data, the following items were used to answer the research questions:
• 24 selected items of the German-language European Health Literacy Survey HLS-EU-Q47 relevant to the question of health literacy of post-discharge patients [1]
• Questions on the evaluation of the patient letter (IG only) and on the assessment of the need for comprehensible and written information on hospitalisation

Analysis
Formation of health literacy indices
Based on the conceptual model of health literacy by Schaeffer et al. [3] the overall health literacy index was formed from 24 health literacy items. The index contains four different competence levels: ‘inadequate’, ‘problematic’ (these two categories are combined into ‘limited/restricted’ health literacy), ‘sufficient’, ‘excellent’ (these two categories are combined into ‘non-restricted’ health literacy). The cut-off values for the competence levels are as follows: 0–50 % of the achieved points ‘inadequate’, > 50–66 % ‘problematic’, > 66–84 % ‘sufficient’ and > 84–100 % ‘excellent’. Furthermore, sub-indices were formed from items that asked about the patients’ ability to find, understand, assess and use information in the areas of disease management, prevention and health promotion.

Statistical evaluation
The influence of the factors gender, age, education level and intervention on health literacy was examined by means of a linear regression model. The calculations were made with the statistics programme SPSS 25.0. The data on the overall index and sub-indices were first analysed descriptively and then compared (comparison of means: T-test for unconnected samples; comparison of frequencies: Pearson’s Chi² test). The significance level was set at 5 %. The overall health literacy index was analysed depending on gender, age, education level, no significant differences between IG and KG in the overall health literacy index were found.

Sub-indices of health literacy
About half of all patients in the total sample showed limited (problematic or inadequate) health literacy in the areas of coping with illness (57 %), prevention (53 %) and health promotion (49 %) after hospitalisation (cf. Fig. 2).

With regard to the four steps of information processing, there were distributional differences in the total sample. For the sub-indices Understanding information and Applying information, almost half of the study participants showed limited health literacy (40 % and 46 % respectively). For the sub-indices Finding information and Assessing information, even more than half showed limited health literacy (57 % and 64 % respectively).

In the descriptive analysis, differences between the IG and KG in the topic area of coping with illness were visible in that fewer patients in the IG had problematic or inadequate health skills than in the KG (55 % vs. 61 %) (cf. Fig. 3). However, the comparative anal-

Table 1 Sample description.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total n (%)</th>
<th>IG n (%)</th>
<th>KG n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study participants</td>
<td>417 (100,0 %)</td>
<td>242 (58,0 %)</td>
<td>175 (42,0 %)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>male</td>
<td>234 (56,1 %)</td>
<td>139 (57,4 %)</td>
<td>95 (54,3 %)</td>
</tr>
<tr>
<td>female</td>
<td>183 (43,9 %)</td>
<td>103 (42,6 %)</td>
<td>80 (45,7 %)</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 to 45 years</td>
<td>13 (3,1 %)</td>
<td>8 (3,3 %)</td>
<td>5 (2,9 %)</td>
</tr>
<tr>
<td>46 to 65 years</td>
<td>107 (25,7 %)</td>
<td>66 (27,3 %)</td>
<td>41 (23,4 %)</td>
</tr>
<tr>
<td>over 65 years</td>
<td>297 (71,2 %)</td>
<td>168 (69,4 %)</td>
<td>129 (73,7 %)</td>
</tr>
<tr>
<td>Educational level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>low</td>
<td>210 (50,4 %)</td>
<td>128 (52,9 %)</td>
<td>82 (46,9 %)</td>
</tr>
<tr>
<td>medium</td>
<td>80 (19,2 %)</td>
<td>43 (17,8 %)</td>
<td>37 (21,1 %)</td>
</tr>
<tr>
<td>high</td>
<td>62 (14,9 %)</td>
<td>32 (13,2 %)</td>
<td>30 (17,1 %)</td>
</tr>
<tr>
<td>not specified</td>
<td>65 (15,6 %)</td>
<td>39 (16,1 %)</td>
<td>26 (14,9 %)</td>
</tr>
<tr>
<td>Health status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>very good – good</td>
<td>106 (25,4 %)</td>
<td>61 (25,2 %)</td>
<td>45 (25,7 %)</td>
</tr>
<tr>
<td>mediocre</td>
<td>215 (51,6 %)</td>
<td>120 (49,6 %)</td>
<td>95 (54,3 %)</td>
</tr>
<tr>
<td>bad – very bad</td>
<td>96 (23,0 %)</td>
<td>61 (25,2 %)</td>
<td>35 (20,0 %)</td>
</tr>
</tbody>
</table>
ysis could not prove significant differences in any of the sub-indi-
ces.

In the descriptive analysis at the level of the individual items of the sub-index coping with illness, a positive mean difference with a Cohen’s d above 0.2 was found for 3 of the 12 items: The patients of the IG rated their ability to follow the general instructions of the doctor or pharmacist as well as to follow these instructions better than those of the KG (cf. Table 2).

### Missing analysis

The missing analysis and analysis of the non-valid answers in the overall index and the sub-indices showed that a high proportion of respondents answered with don’t know or not at all (8 % IG vs. 20 % KG).

### Table 2  Individual items with Cohen’s d ≥ 0.20.

<table>
<thead>
<tr>
<th>Item: How easy/how difficult is it ...</th>
<th>Group</th>
<th>MW (1–4)</th>
<th>SD</th>
<th>MW diff.</th>
<th>SD (gep.)</th>
<th>Coh-ens d</th>
</tr>
</thead>
<tbody>
<tr>
<td>...to follow the instructions of your doctor or pharmacist?</td>
<td>IG (n = 225)</td>
<td>3.39 0.62</td>
<td>0.13</td>
<td>0.64</td>
<td>0.20</td>
<td></td>
</tr>
<tr>
<td>Control group (n = 170)</td>
<td>KG (n = 156)</td>
<td>3.26 0.67</td>
<td>0.13</td>
<td>0.64</td>
<td>0.20</td>
<td></td>
</tr>
</tbody>
</table>

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**Fig. 1** Overall health literacy index.

**Fig. 2** Sub-indices of health literacy.

**Fig. 3** Disease management sub-index stratified according to study groups.
ly fewer difficulties with health information than the HLS-GER. In the area of health (57 % vs. 67 %) and illness (40 % vs. 60 %), assessing (64 % vs. 69 %) and applying (46 % vs. 58 %) health information than in the HLS-GER. The proportion of study participants with limited health literacy in the areas of coping with illness (57 % vs. 67 %) and prevention (53 % vs. 60 %) is slightly lower than in the vulnerable groups of the HLS-GER. In the area of health promotion, the study participants in this study reported significantly fewer difficulties with health information than the HLS-GER respondents (49 % vs. 78 %) [3].

It is possible that these results are based on the fact that patients have dealt intensively with their illness and measures to improve their health after an inpatient stay (hospital effect) and thus show higher health literacy.

The patient letter was not only aimed at improving the individual competences and skills of patients. By providing individual, written and easily understandable information as an information intervention of a hospital, a reduction of the demands on patients in the context of a hospital stay (organisational health literacy) was to be achieved. Therefore, there were no significant differences between IG and KG for the complex overall health literacy index and the sub-indices depicting personal competencies and skills.

However, there was a positive trend in three individual aspects of coping with the disease: more patients in the intervention group than in the control group stated that they were able to apply medical information well. Also, more patients in the IG vs. KG stated that they were able to understand and implement instructions on prescribed medication. This can be explained by the fact that the patient letter not only conveys knowledge about the disease, but also creates an understanding in the patient to deal with the disease himself. These are very relevant competence enhancements for post-discharge patients, as they have a direct effect on how they deal with and cope with their existing illness.

The patient letter was widely accepted by the patients in the intervention group and was rated as informative, comprehensible and helpful. 99 % of all post-discharge patients from IG and KG wanted comprehensible and written information about their hospital stay at discharge. These results show a need on the part of patients to improve organisational health literacy by improving patient information on discharge from hospital. However, a broad implementation of the patient letter requires automation in order to be able to process more discharge letters promptly and thus minimise the additional burden on doctors.

In addition, based on the study results further research could examine if a better understanding of medical matters can lead to enhanced adherences or even to behavioral changes of patients.

**Methodological limitations**

Only patients who had consciously decided to receive a patient letter when they consented to the study took part in the study (selection bias). The fact that patients interested in their health show a higher health literacy even without intervention could explain the differences in health literacy between IG and KG. The comparison of the study results with the results of the HLS-GER [3] strengthens this thesis.

In order to adapt the questionnaire to the target group, only 24 items from the HLS-GER relevant to the question of health literacy of post-discharge patients were used. These were not answered or not answered validly by a considerable proportion of the respondents. This indicates that some HLS-EU questions on health literacy are difficult to answer by the older age group without additional explanations. In addition the questionnaire might be less suitable when used as a written survey instrument. The HLS-GER study, unlike the present study, used face-to-face interviews and the full HLS-EU Q47. Therefore, the comparison of the health literacy of the respective respondents as well as the validity of the results on the impact of the patient letter on health literacy might be limited. An age-group related validation [12] and exact verification of the oral vs. written use of the HLS-EU-Q47 would therefore be desirable.

Only valid responses were included in the analysis of the indices and individual items of health literacy, which reduced the size of the samples in IG and KG, so that with the available number of cases and a power of 80 %, an effect size of 0.351 would have been necessary to be able to detect significant group differences in health literacy. However, this pilot study provided important content-related and methodological results useful for planning follow-up studies.
CONCLUSION FOR THE PRACTICE

- A large proportion of (post-) inpatients show problematic or inadequate health literacy. This vulnerable patient group must be given special attention when developing measures to strengthen health literacy.
- An easy-to-understand patient letter after hospitalisation has the potential to help patients to independently find and understand information about medication and health condition, as well as to better understand medical information and recommendations, which reduces uncertainties in dealing with disease and treatment.
- Patients have a great need for understandable health information. An easy-to-understand patient letter is rated by patients as a helpful source of information (also for relatives).
- Hospitals should integrate comprehensible, individual and written patient information to strengthen health literacy into their discharge management.

Data protection and ethics

The project complied with the data protection regulations of the State Data Protection Commissioner of Lower Saxony, Germany (AZ: 2.2–1400–01/009) and received an approval from the Ethics Committee at the Technical University Dresden, Germany (AZ: EK 30012016).

Fundings

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Conflict of Interest

Aj is managing partner of ‘Was hab’ ich?’ gGmbH, which developed the patient letter. All other authors confirm that there are no conflicts of interest.

References


