

# 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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### Key Words

Health literacy, patient letter, hospitalization, discharge management, patient empowerment

### Schlüsselwörter

Gesundheitskompetenz, Patientenbrief, Krankenhausaufenthalt, Entlassmanagement Patientenbefähigung

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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 (Cohens  $d \geq 0.20$ ). 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-

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heitsoutcomes und höherer Inanspruchnahme des Gesundheitssystems.

**Ziel der Arbeit** In der Pilotstudie wurden Effekte eines Patientenbriefs auf die Gesundheitskompetenz nachstationärer Patienten einer Inneren Klinik mittels HLS-EU-Q47 untersucht. Zudem wurde der Bedarf an schriftlichen, leicht verständlichen Informationen analysiert.

**Methodik** In einer randomisiert kontrollierten Studie (2016–2018) wurden die Effekte des Patientenbriefs auf die Gesundheitskompetenz nachstationärer Patienten mittels eines Fragebogens geprüft. Die Interventionsgruppe (IG, n = 242) erhielt 3 Tage nach Entlassung einen Patientenbrief, die Kontrollgruppe (KG, n = 175) nur den üblichen ärztlichen Entlassbrief.

**Ergebnisse** 60 % der Patienten wiesen eine eingeschränkte Gesundheitskompetenz auf. Die Studie konnte keinen Einfluss

der Patientenbriefe auf das Gesamtkonzept Gesundheitskompetenz nachweisen. Die Analyse von Einzelitems der Gesundheitskompetenz zeigte, dass das Verständnis von ärztlichen Anweisungen sowie das Verstehen und Anwenden von Informationen und Einnahmehinweisen zu Medikamenten stieg (Cohens  $d \geq 0,20$ ). Zudem berichteten Patienten einen hohen Bedarf an Informationen nach Krankenhausaufenthalt (99 %) und bewerteten den Patientenbrief als informativ, verständlich und hilfreich.

**Schlussfolgerungen** Ein leicht verständlicher Patientenbrief befähigt Patienten zum besseren Verstehen und Anwenden medizinischer Informationen und Anweisungen. Patientenseitig besteht ein hoher Bedarf an verständlichen Informationen nach Krankenhausaufenthalt.

## 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 Chi<sup>2</sup> test). The significance level was set at 5%. The 24 individual health literacy items were analysed exclusively descriptively. Cohen's d was calculated as an effect measure to test if and how the mean values of the IG and KG differ.

## Results

### Sample description

Of 1,772 questionnaires sent by post, 417 (24%) completed questionnaires (IG: n = 242, KG: n = 175) could be included in the analysis.

56% of all participating patients were male. The average age of the study participants was 70.6 years, with those over 65 representing the largest age group (71%). Half of the study participants (50%) had a low, 19% a medium and 15% a high level of education. About half of the respondents rated their health as average and a quarter each as good/very good or bad/very bad (see ► **Table 1**).

### Overall health literacy index

In the entire sample, 17% of the respondents had *inadequate* health literacy and 43% had *problematic* health literacy. 30% of the respondents had *adequate health literacy* and 11% had *excellent* health literacy (cf. ► **Fig. 1**). Overall, 60% reported *limited* health literacy.

The results of the intervention and control group differed only slightly, the differences were not significant ( $p = 0.775$ ).

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

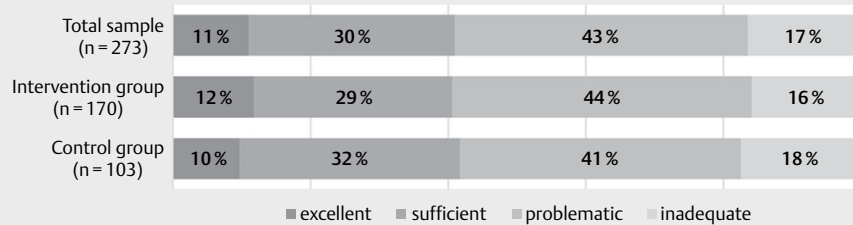
About half of all patients in the total sample showed *limited* (problematic or inadequate) health literacy in the areas of *coping with illness* (57%), *prevention* (53%) and *health promotion* (49%) after hospitalisation (cf. ► **Fig. 2**).

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).

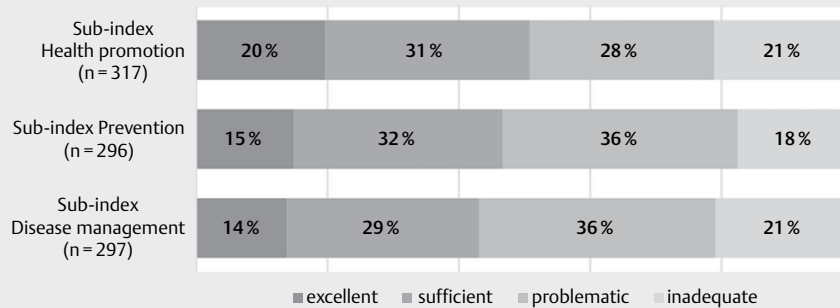
In the descriptive analysis, differences between the IG and KG in the topic area of coping with illness were visible in that fewer patients in the IG had problematic or inadequate health skills than in the KG (55% vs. 61%) (cf. ► **Fig. 3**). However, the comparative anal-

► **Table 1** Sample description.

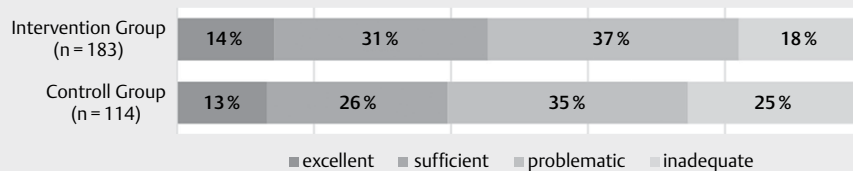
Variable	Total n (%)	IG n (%)	KG n (%)
<b>Study participants</b>	417 (100,0%)	242 (58,0%)	175 (42,0%)
<b>Gender</b>			
male	234 (56,1%)	139 (57,4%)	95 (54,3%)
female	183 (43,9%)	103 (42,6%)	80 (45,7%)
<b>Age</b>			
20 to 45 years	13 (3,1%)	8 (3,3%)	5 (2,9%)
46 to 65 years	107 (25,7%)	66 (27,3%)	41 (23,4%)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



► Fig. 1 Overall health literacy index.



► Fig. 2 Sub-indices of health literacy.



► Fig. 3 Disease management sub-index stratified according to study groups.

► Table 2 Individual items with Cohen's  $d \geq 0.20$ .

Item: How easy/how difficult is it ...	Group	MW (1–4)	SD	MW diff.	SD (gep.)	Coh-ens d
...understand your doctor's or pharmacist's instructions for taking prescribed medication?	IG (n = 221)	3,29	0,68	0,15	0,71	0,21
	KG (n = 157)	3,14	0,74			
...to follow the instructions for taking medication?	IG (n = 226)	3,38	0,62	0,13	0,64	0,20
	KG (n = 160)	3,26	0,66			
...to follow the instructions of your doctor or pharmacist?	IG (n = 225)	3,39	0,62	0,13	0,64	0,20
	KG (n = 156)	3,26	0,67			

ysis could not prove significant differences in any of the sub-indices.

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*, to *understand the instructions of the doctor or*

*pharmacist for taking medication 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, Chi<sup>2</sup>-test:  $p = 0.006$ ). The comparative analysis showed that significantly more respondents in the KG did not know how to assess their competence in dealing with health information.

### Acceptance of the patient letter

Patients in the intervention group were asked about the use and benefits of the patient letter. 87% said they had read it in detail. About half (53%) of the respondents had shown it to another person and a quarter (25%) had shown it to at least two other people. 76% had spoken to one or more people about the patient letter. The patient letter was predominantly rated by the respondents of the intervention group as informative (97%), understandable (97%) and helpful (95%).

99% of all post-hospital patients found it important/very important to be able to take home an understandable, written explanation of the findings after each hospital stay; there were no differences between IG and KG.

### Discussion

The sample consisted of predominantly older patients with low educational status. These characteristics are associated with chronic diseases [10] and limited health literacy [3, 11]. Thus, as recommended by the National Health Literacy Action Plan [8], the present pilot study provides relevant data for this vulnerable population group.

60% of the study participants reported difficulties in dealing with health-related information (vs. 54% in the representative population sample of Germany – HLS-GER [3]). In the present study, population groups of similar age and disease burden as in the subgroup analyses of the HLS-GER [3] were examined. The present study shows that fewer patients had limited health literacy than the chronically ill (60% vs. 73%) and older populations (60% vs. 66%) examined in the HLS-GER. Fewer participants in the present study reported problems in *finding* (57% vs. 71%), *understanding* (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).

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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.

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