BMJ Open

Effects of culture-sensitive adaptation of patient information material on usefulness in migrants: a multicentre, blinded randomised controlled trial

Lars P Hölzel,[1] Zivile Ries,[1] Levente Kriston,[2] Jörg Dirmaier,[2] Jördis M Zill,[2] Christine Rummel-Kluge,[3,4] Wilhelm Niebling,[5] Isaac Bermejo,[6] Martin Härter[2]

For numbered affiliations see end of article.

Correspondence to
Dr Lars P Hölzel; lars.hoelzel@uniklinik-freiburg.de

ABSTRACT

Objectives: To evaluate the usefulness of culture-sensitive patient information material compared with standard translated material.

Design: Multicentre, double-blind randomised controlled trial.

Setting: 37 primary care practices.

Participants: 435 adult primary care patients with a migration background with unipolar depressive disorder or non-specific chronic low back pain were randomised. Patients who were unable to read in the language of their respective migration background were excluded. Sufficient data were obtained from 203 women and 106 men. The largest group was of Russian origin (202 patients), followed by those of Turkish (52), Polish (30) and Italian (25) origin.

Interventions: Intervention group: provision of culture-sensitive adapted material. Control group: provision of standard translated material.

Main outcome measures: Primary outcome: patient-rated usefulness (USE) assessed immediately after patients received the material. Secondary outcomes: patient-rated usefulness after 8 weeks and 6 months, symptoms of depression (PHQ-9), back pain (Back Pain Core Set) and quality of life (WHO-5) assessed at all time points.

Results: Usefulness was found to be significantly higher (t=1.708, one-sided p=0.04) in the intervention group (USE-score=65.08, SE=1.43), compared with the control group (61.43, SE=1.63), immediately after patients received the material, in the intention-to-treat analysis, with a mean difference of 3.65 (one-sided 95% lower confidence limit=0.13). No significant differences were found for usefulness at follow-up (p=0.16, p=0.71). No significant effect was found for symptom severity in depression (p=0.95, p=0.66, p=0.58), back pain (p=0.40, p=0.45, p=0.32) or quality of life (p=0.76, p=0.86, p=0.21), either immediately after receiving the material, or at follow-up (8 weeks; 6 months). Patients with a lower level of dominant society immersion benefited substantially and significantly more from the intervention than patients with a high level of immersion (p=0.005).

Conclusion: Cultural adaptation of patient information material provides benefits over high quality translations. Clinicians are encouraged to use culture-sensitive material in their consultations, particularly with low-acculturated patients.

Strengths and limitations of this study

- High internal and external validity of the study design.
- Blinding of patients and general practitioners (GPs) with regard to study group allocation.
- Blinding of statistician to ensure objectivity.
- Questionnaire-based outcomes.
- High clinical heterogeneity of the sample may have diluted intervention effects.

BACKGROUND

Migration is an increasingly important global issue. A substantial and growing proportion (~20% at present) of the German population has a migration background.[1] Provision of a high quality of care regardless of cultural background is challenging both for physicians and policymakers.[2] Currently, migrants often receive poorer care than the indigenous population.[3–6] In Germany, migrants are frequently poorly informed and underuse preventive healthcare services.[7]

Therefore, evidence-based measures to improve care for migrants are urgently needed. However, high-quality studies on healthcare interventions for migrants are lacking.[2]

Patient engagement and empowerment are central issues in current debates on improving healthcare,[8] especially for chronic illnesses and mental disorders.[9] A fundamental strategy to promote patient engagement and

empowerment is the improvement of health literacy.[8] Written patient information materials (PIMs) are a useful adjunct to professional consultation and expert advice, in order to inform and educate patients and thus increase their engagement and empowerment.[8 10]

Language-appropriate PIMs for migrants are often 'one of the first and most critical' interventions to improve healthcare, as they can help to overcome language barriers.[11] However, a simple translation may not sufficiently provide for cultural differences.[12] An additional cultural adaptation may therefore be needed.

There is a growing body of evidence for the positive effects of culturally adapted interventions. Meta-analyses for culturally adapted psychotherapy and health-related training exist.[13–15] A randomised controlled trial comparing standard and culture-sensitive PIMs for African-American adults found promising results in favour of culture-sensitive PIMs.[16] However, there is a lack of randomised controlled trials with patients and physicians blinded for group allocation and comparing culture-sensitive PIM with high-quality translations. The aim of the present study was to address this in a multicentre randomised controlled trial.

METHODS
Design
The effects of culture-sensitive PIMs, compared with standard translated PIMs, were investigated in a patient-blinded, physician-blinded and statistician-blinded randomised controlled multicentre trial. Participants were recruited from primary care, as general practitioners (GPs) usually serve as the first point of contact in healthcare. Patients in this setting often need initial information on their health problem and treatment options, which can be provided in PIMs. Academic training practices, practices in cooperating networks and publicly registered GPs in the areas of Freiburg, Hamburg, Oberhausen-Mülheim-Duisburg and Leipzig were invited to participate in the study.

Further information can be found in the published study protocol[17] and the study registration at the German Register for Clinical Trials (DRKS00004241).

Inclusion and exclusion criteria
Adult primary care patients with a Turkish, Polish, Russian or Italian migration background, and with indications of unipolar depressive disorder (International Classification of Diseases (ICD-10): codes F32.xx, F33.xx, F34.1) or non-specific chronic low back pain (ICD-10 codes: M54.5, M54.8, M54.9), based on clinical diagnosis, were eligible for inclusion in our randomised trial. Migration background was defined according to the definition of the Federal Statistical Office of Germany as being of non-German nationality, having a first language other than German, being born in another country or having a parent who was born in a country other than Germany.[1 18] To be eligible, patients had to identify themselves with their non-German origin. To ensure a high external validity of the study, exclusion criteria were kept to a minimum. Since our intervention was based on written PIMs, and required that patients complete written questionnaires, those who felt unable to read PIMs in the language of their respective migration background were excluded.

Intervention and comparator
The PIMs for both illnesses were based on German clinical practice guidelines.[19 20] Information on prevalence, diagnoses and prognosis, treatment options and responsibilities of different healthcare providers was given. To exclude the influence of potentially confounding factors other than culture, we focused on developing high-quality materials that were suitable for migrants based on aspects other than culture (eg, comprehensibility, length and reading level). The final brochure consisted of 12 pages, and included figures, pictures and illustrative case examples. For the control group (CG), a high-quality translation of the German version of the PIMs was administered, using the forward–backward translation procedure.[21] Patients in the intervention group (IG) received the culture-sensitive PIMs, which were based on the translated version and included adaptations for the respective migration background. The adaptations were based on the results of four separate focus groups, one for each migration background.[17] In these focus groups, the cultural appropriateness of the translated materials was discussed. Focus group participants had to have one of the four relevant migration backgrounds and live in Germany. They also had to be able to read and write in German and in the language of the country of their origin. The group discussions were audio recorded, transcribed, analysed using qualitative methods and adapted based on the qualitative results. Cultural adaptations primarily focused on presentation; the core information remained unchanged and patients in both groups received evidence-based information in their native language (see tables 1 and 2). Detailed descriptions of the adaptation process and the focus group results are published in the study protocol[17] or are being prepared for publication. The PIMs can be found at http://rg-hoelzel.uniklinik-freiburg.de/material.

Administration
GPs of academic training practices, practices of the cooperating networks and GPs listed in public registers were invited to participate in the study. GPs consecutively assessed patients for eligibility and applied inclusion and exclusion criteria (for details, see ref. 17). Eligible patients were invited to participate by the GP and received information on the study after the consultation ($-T_1$, enrolment). Written informed consent was obtained by the GP. To ensure comprehensibility of the information, translated consent forms were used. GPs then handed out a sealed envelope (T_0, allocation)

Table 1 Culture-sensitive adaptations of patient information materials for depression

Component (standard version)	Italian	Polish	Russian	Turkish
Cover picture (young woman sitting in front of a laptop, holding her head and looking sad)	Cover picture changed to an elderly woman Background colour changed from grey to black	No changes	Cover picture changed to a woman sitting on the floor	No changes
Illustrative case examples (German names, professions: bricklayer, doctor's receptionist, teacher, pensioner)	50% Italian names Professions: carpenter, doctor's receptionist, cleaner, bank employee	50% Polish names 50% pictures of people of Polish appearance	No changes	50% Turkish names 50% pictures of people of Turkish appearance
Social themes of different topics of the PIM (not in the focus)	Social themes 'relations with friends and family' were incorporated into several topics 'Material conflicts on returning to Italy or staying in Germany' was used as an example for a social risk factor for depression	No changes	No changes	Social themes 'relations with friends, family and neighbours' were incorporated into several topics
Biological aspects (explanation of the biopsychosocial model of depression, no additional explanation on the rationale for antidepressant use)	Additional biological mechanisms/rationale for antidepressant use: explained in more depth	No changes	No changes	No changes
Specific metaphors/idioms ('grey' for depression, to feel 'very small')	'Black' for depression	No changes	No changes	'Life has lost its taste'
Stigma (only information on prevalence of depression in general)	No changes	Additional antistigma statement (depression can affect everyone, is not a personal failure, is a medical condition, can be treated effectively, is curable)	Additional antistigma statement (depression can affect everyone, is a medical condition, is an indication to seek professional help, is curable)	Additional antistigma statement (depression can affect everyone, is a medical condition, can be treated effectively, is curable)
Health insurance (information on costs for psychotherapeutic methods that are covered)	No changes	Information on costs for therapeutic methods that are covered Additional information on costs for single therapy sessions that are covered	No changes	No changes
Medication (information on antidepressants: effects, side effects, no risk of dependence, no effects on personality)	No changes	Differences between antidepressants and other psychotropic drugs	No changes	No changes

Continued

Table 1 Continued

Component (standard version)	Italian	Polish	Russian	Turkish
Healthcare provider (comparison of the GP's and psychiatrist's/psychotherapist's roles)	No changes	Role of the GP as first point of contact and coordinator of care in Germany was emphasised	Encouragement to seek help for professional treatment Role of the GP as first point of contact and coordinator of care in Germany was emphasised Indications for psychiatric treatment	Encouragement to seek help for professional treatment Encouragement to entrust GPs with, and be open about providing, private information
Confidentiality (no information on confidentiality)	No changes	Information on German laws on confidentiality	Information on German laws on confidentiality Freedom to start and end the treatment	No changes
Other (addressing the reader formally, explanation of depression symptoms)	No changes	Reader was addressed informally	Differences between everyday experiences (sadness, bad mood) and depression were explained	No changes

GP, general practitioner.

containing the PIM and a questionnaire. By using sealed envelopes, it was ensured that both GPs and patients were blind to the group allocation. The content of the envelopes (standard translated vs culturally adapted PIMs) was centrally randomised by a computer-based algorithm with a 1:1 allocation ratio, and stratified by physician, illness and migration background with varying block sizes. The random allocation sequence was generated by the trial statistician and prepared by the research team (whose members were not directly involved in patient recruitment). Concomitant care was not restricted in any way. After the consultation, patients were asked to read the PIMs and fill in the questionnaire containing all T_1-measures (T_1, after consultation) and return it by post (detailed information can be found in the published study protocol).[17] At 8 weeks (T_2) and 6 months (T_3) after the consultation, patients were contacted by post and asked to fill in follow-up questionnaires. Patients were reminded by the leading study centre, by telephone after 2 weeks and by post after 3 weeks, if they had still not sent back the questionnaire. To ensure a sufficient response rate at each time point, patients received an unconditional reimbursement of €5 for filling in each questionnaire.[22] GPs received an allowance of €40, and the receptionist €5, per patient recruited.

Measures

Age (years), sex, duration of residence in Germany (years), education (number of years) and level of acculturation (Stephenson Multigroup Acculturation Scale, SMAS)[23] were assessed at T_1. The SMAS has two scales: 'ethnic society immersion' (describing the level of identification with the native culture) and 'dominant society immersion' (describing the level of acculturation in the dominant society of habitation).[23]

According to current theories for the evaluation of the effectiveness of PIMs, and consistent with the concept of patient empowerment, the patient's judgement of usefulness is the final outcome in the process of reading, understanding and responding to PIMs.[24] An instrument to assess this judgement is the Usefulness Scale for Patient Information Material (USE).[25] Therefore, we chose this scale to assess the primary outcome, usefulness, after patients had consulted and read the material (T_1). Usefulness is measured on a global scale over three subscales which assess cognitive, emotional and behavioural subdimensions. The global score ranges from 0 to 90, and each subscale score ranges from 0 to 30. High scores indicate high usefulness of the PIMs. The instrument showed excellent psychometric properties.[25] Our primary hypothesis was that culturally adapted PIMs are perceived to be more useful than the standard translated materials.

Secondary outcomes were usefulness of PIMs (measured on the USE) assessed after 8 weeks (T_2) and 6 months (T_3); subdimensions of usefulness (also measured on the USE); symptoms of depression or back

Table 2 Culture-sensitive adaptations of patient information materials for chronic low back pain

Component (standard version)	Italian	Polish	Russian	Turkish
Illustrative case examples (German names; professions: seller, bank employee, professor, housewife)	50% Italian names Professions: retired tram conductor, confectioner, sales person, teacher Inclusion of pensioner Housewife was changed to teacher	50% Polish names 50% pictures of people of Polish appearance Professions: electrician, student, tax consultant, housewife	All illustrative case examples were deleted	50% Turkish names 50% pictures of people of Turkish appearance
Social themes of different topics of the PIM (not in the focus)	Social themes 'relations with friends and family' were incorporated into several topics	No changes	No changes	Information incorporated outlining the benefits of social support for treatment of chronic low back pain, especially in 'becoming more active'
Healthcare provider (multidisciplinary approach, GP as central coordinator of care)	Role of the GP as first point of contact and coordinator of care was highlighted	Responsibility of the GP for diagnosis and treatment was highlighted	Responsibility of the GP for diagnosis and treatment was highlighted	No changes
Diagnosis (consultation and physical examination as standard, further tests if another illness suspected)	No changes	No changes	It was highlighted that imaging procedures are not needed in routine procedure	No changes
Physical activities (fitness studio, swimming)	Changed from fitness studio and swimming to going for a walk and a bike ride	No changes	In-depth explanation on why rest is harmful and why physical activities are so important	Changed from fitness studio and swimming to going for a walk and a bike ride Differences between homework, manual work and physical activities were highlighted
Other (Anglicisms common to German everyday language were used)	All Anglicisms were omitted	No changes	No changes	No changes

pain assessed by the Patient Health Questionnaire (PHQ-9) and Back Pain Core Set, respectively;[26 27] and quality of life, assessed by the five-item WHO Well-Being Index (WHO-5)[28] at all time points (T_1, T_2, T_3).

Statistical analyses

We compared standard PIMs (the control group) with customised PIMs (as one group) in the main analyses. The common characteristics of the study participants were the migration background and suffering from a chronic disease. Although there was diversity in these variables (four different cultural backgrounds and two different illnesses), we assumed that the main effective component of the intervention (adaptation of information) functioned in a comparable way across all groups. Thus, we considered the groups to be functionally equivalent for the purpose of this study. However, since dealing with clinical heterogeneity is a frequently controversial issue,[29] we performed a series of sensitivity analyses to test whether migration background, illness or both moderate the intervention effect.

The primary outcome was analysed by a statistician (blinded to group allocation) using a t-test to test the directed hypothesis that the culturally adapted PIM is superior to the standard PIM, as specified in the study protocol.[17] According to the intention-to-treat principle, all randomised participants were included in this analysis. The required sample size for the primary outcome analysis was determined to be 280 patients (140 per group, with an expected Cohen's d of 0.3, a one-sided type I error of 0.05 and a power of 80%) with sufficiently complete data (ie, missing data ≤30%).[17] At the scale level, missing data were handled by applying expectation-maximisation imputation. For the intention-to-treat analysis, missing data at the case level were handled using multiple imputation. We used an iterative Markov chain Monte Carlo (MCMC) method (fully conditional specification) with 20 imputations.[30] Predictor variables

for imputing missing values were study region, illness and migration background, as these were the only available data from patients not responding at T_1. All secondary analyses were of an explorative nature and performed by fitting a repeated measures random-intercept mixed model with the three measurement time points clustered within participants (scaled identity covariance structure for repeated measures)[31] and group allocation, time point and the group×time point interaction as explanatory variables. In additional analyses, moderation effects of study region, illness, migration background, symptom severity and level of acculturation[23] were tested by amending the model with the respective variables and their interaction with the group variable. All analyses were performed using IBM SPSS Statistics V.21.0 (IBM Corporation, Armonk, New York, USA) and conducted in accordance with the study registration and study protocol.[17]

Results

From June 2013 to August 2014, 37 primary care practices invited 503 patients to participate in the study. Recruitment ended after the targeted statistical power was reached. Two patients did not identify themselves with their migration background and therefore did not meet the inclusion criteria. Two patients were excluded because written consent was not obtained. Sixty-four patients refused to participate for the following reasons: not interested in the study topic (34 patients), did not want to use written material (6 patients), were suspicious of scientific studies (4 patients), had problems with reading (3 patients), felt too ill to participate (2 patients), were unable to read the language of the PIMs (1 patient) or had other or undisclosed reasons (14 patients). We randomised 435 participants, of whom 317 responded at T_1 (72.9%) and 309 (71.0%) were included in the analyses (missing data ≤30%; see figure 1). Data from 288 patients (64.7%, CG=136, IG=152) at T_2 and 261 patients (58.7%, CG=125, IG=136) at T_3 were analysed.

A dropout analysis using binary logistic regression indicated that group allocation, study region, illness, migration background and the two-way interaction terms between group allocation and all other variables were not significantly associated with dropping out between randomisation and T_1 (Nagelkerke's R^2=0.07, χ^2_{15}=21.4, p=0.13). Approximately 1.7% of the total data points were missing at the item level and imputed by expectation-maximisation. For the primary analysis, data for 126 of 435 randomised patients (29.0% missing) were imputed by multiple imputation.

Sample characteristics

Demographic and clinical characteristics are reported in table 3. More women than men participated in the study. Age distribution of participants was 15.7% between 18 and 40 years, 52% between 41 and 60 years and 32.4% older than 60. On average, participants had ~10 years of education. The average duration of residency in Germany was ~20 years, with 4.5% living in Germany for up to 5 years, 37.8% between 6 and 15 years, 36.4% between 16 and 25 years and 21.3% more than 26 years. More patients with chronic low back pain than patients with depression were recruited. The majority of patients were in the group with a Russian migration background, with the Turkish group as the second largest, followed by the Polish and Italian groups. The intervention and control groups were well balanced with respect to sample characteristics of patients.

Primary outcome

Both groups reported high scores for the subjective usefulness of the PIMs after the consultation (T_1). The IG group (227 patients) had a mean score of 65.08 (SE=1.43) and the CG group (208 patients) had a mean score of 61.43 (SE=1.63). Accordingly, the average rating in the IG group was ~4 points higher than in the CG group (mean difference 3.65; one-sided 95% lower confidence limit=0.13). This difference reached statistical significance (one-sided t=1.708, p=0.04). The results correspond to a standardised mean difference (Cohen's d) of 0.18.
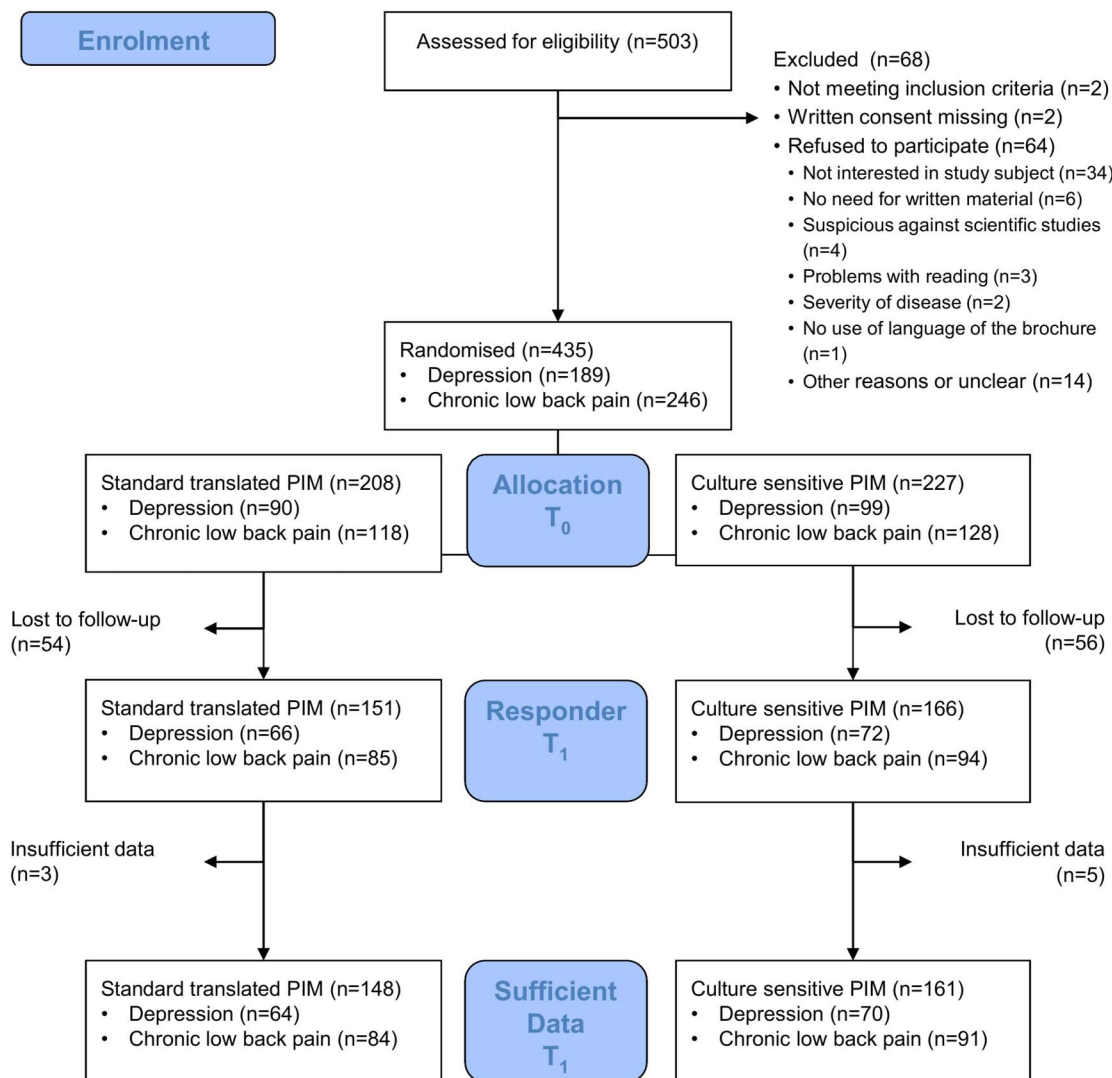
In a sensitivity analysis using a mixed models approach including all available data, we confirmed the results for the primary outcome (p=0.03) with a similar mean difference (4.41; one-sided 95% lower confidence limit=0.47).

Secondary outcomes

Regarding the usefulness of PIMs, the difference between the two groups decreased over time (see table 4). No statistically significant differences were found for total score after 8 weeks (T_2) or 6 months (T_3). The emotional subscale showed a statistically significant difference at T_1 (p=0.020; mean difference=2.15; 95% CI 0.34 to 3.96), a tendency at T_2 (p=0.07; mean difference=1.73; 95% CI −0.14 to 3.60) and no difference at T_3 (p=0.54; mean difference=0.61; 95% CI −1.33 to 2.55). For the behavioural subscale, scores tended to be higher in the IG at T_1. We found no significant statistical effect for the cognitive subscale, symptom severity of illness (depression or back pain) or quality of life.

Effect moderators

Study region, illness and symptom severity were not found to be associated with intervention effect regarding the primary outcome (p>0.10; see online supplementary materials for details). However, the difference between the IG and CG was 11.33 points smaller (95% CI −24.33 to 1.68; p=0.09) in patients with a Polish migration background than in those with a Russian background. Furthermore, the superiority of the adapted PIM over the standard PIM was substantially larger in patients with a low level of dominant society immersion

Enrolment

Assessed for eligibility (n=503)

Excluded (n=68)
• Not meeting inclusion criteria (n=2)
• Written consent missing (n=2)
• Refused to participate (n=64)
  • Not interested in study subject (n=34)
  • No need for written material (n=6)
  • Suspicious against scientific studies (n=4)
  • Problems with reading (n=3)
  • Severity of disease (n=2)
  • No use of language of the brochure (n=1)
• Other reasons or unclear (n=14)

Randomised (n=435)
• Depression (n=189)
• Chronic low back pain (n=246)

Allocation T$_0$

Standard translated PIM (n=208)
• Depression (n=90)
• Chronic low back pain (n=118)

Culture sensitive PIM (n=227)
• Depression (n=99)
• Chronic low back pain (n=128)

Lost to follow-up (n=54)

Lost to follow-up (n=56)

Responder T$_1$

Standard translated PIM (n=151)
• Depression (n=66)
• Chronic low back pain (n=85)

Culture sensitive PIM (n=166)
• Depression (n=72)
• Chronic low back pain (n=94)

Insufficient data (n=3)

Insufficient data (n=5)

Sufficient Data T$_1$

Standard translated PIM (n=148)
• Depression (n=64)
• Chronic low back pain (n=84)

Culture sensitive PIM (n=161)
• Depression (n=70)
• Chronic low back pain (n=91)

Figure 1 Patient flow diagram.

(acculturation) than in high-acculturated patients. The intervention versus control difference in usefulness was 14.69 points, with one step decrease in acculturation on a four point scale (95% CI 4.46 to 24.91; p=0.005). Acculturation was also shown to be responsible for the aforementioned difference in effectiveness between Polish and Russian patients (the Polish patients were better acculturated than the Russian ones), turning the effect of migration background non-significant (p>0.10) when added to the model (see online supplementary materials for details).

DISCUSSION
In this trial, we investigated the effects of cultural adaptation of high-quality translations of PIMs. While both versions were rated to be of high subjective usefulness, the adapted material was judged to be significantly more useful than the translated version after reading the PIM, which was handed out by the GP after the consultation. However, this difference decreased over time and was not statistically significant after 8 weeks or 6 months. The initial difference was mainly driven by differences on the emotional subscale. Further effects on clinical outcomes or quality of life were not found.

A central limitation of our study is that the USE had been developed and validated in German. The translations used in this study had been conducted using the forward–backward method and had been pilot tested by people with migration backgrounds using the think-aloud method. However, an investigation of the psychometric properties of the translated version is still lacking. Another limitation is that all outcomes were questionnaire-based and therefore subjective. However, given that GPs and patients were blinded with regard to study group, an expectation bias seems unlikely. Another limitation is the clinical heterogeneity of the sample. We decided to include patients from various migrant groups, with illness at various stages and with no restrictions relating to duration of residency in Germany. These differences may have diluted the intervention effects. Nevertheless, this heterogeneity improved the

Table 3 Sample characteristics

	Intervention group (n=161)	Control group (n=148)	Total sample (n=309)
Demographic characteristics			
Age; years			
Mean (SD)	54.5 (14.4)	55.4 (11.7)	54.94 (13.1)
Sex; n (%)			
Female	110 (68.3)	93 (62.8)	203 (65.7)
Education; years.			
Mean (SD)	10.0 (2.6)	9.6 (2.2)	9.7 (2.4)
Duration of residency in Germany; years			
Mean (SD)	19.9 (10.7)	19.6 (10.6)	19.8 (11.5)
Illness; n (%)			
Depression	70 (43.5)	64 (43.2)	134 (43.4)
Chronic low back pain	91 (56.5)	84 (56.8)	175 (56.6)
Migration background; n (%)			
Russian	104 (64.6)	98 (66.2)	202 (65.4)
Turkish	26 (16.1)	26 (17.6)	52 (16.8)
Polish	17 (10.6)	13 (8.8)	30 (9.7)
Italian	14 (8.7)	11 (7.4)	25 (8.1)

Mean based on deviating sample sizes due to missing data, age: n=159/147/306, education: 127/121/248, residency in Germany: n=149/142/291.
n, number.

recruitment potential and is likely to have increased the external validity of the results. Similar limitations exist regarding the study intervention. Given the fact that we developed eight different versions of culture-adapted PIMs, which included versions for depression and chronic low back pain for four different migration backgrounds, the effects for some of the secondary outcomes may have been diluted. On the other hand, we used the same procedure to develop all culturally adapted materials.[17] The level of comparison is therefore the effect of culturally adapted materials in patients with migration backgrounds living in Germany and suffering from a potentially chronic illness. Moderator analyses supported the assumption of functional equivalence of the intervention across migration backgrounds and illnesses, but also suggested that the superiority in usefulness of the adapted over the standard materials is likely to be substantially larger in patients with a low rather than a high level of acculturation.

The key strength of this study is the high internal and external validity. By applying a central randomisation procedure, using a computer-based algorithm with varying block sizes and by providing patients with the PIMs and questionnaire in sealed envelopes, allocation bias seems unlikely. The use of sealed envelopes, to blind patients and GPs with regard to study group allocation, was carried out to prevent performance bias. The statistician was also blind to patient group allocation when primary analysis was performed, to ensure objectivity. These measures ensured a high internal validity.

The involvement of a large number of primary care practices in four different regions of Germany, the evaluation of four migrant groups and two different illnesses, as well as the broad inclusion criteria, ensured a high external validity of the results. The dropout rate was lower than expected and a systematic dropout is unlikely. In consideration of the low rate of refusal to participate in the study and the low dropout rate, we conclude that acceptance of our intervention was high in our sample. However, we cannot conclusively determine the representativeness of our sample. The sample seems to be older and contain a higher proportion of women than the general population with a migration background.[1] Since patients with chronic low back pain and depression are usually older and predominantly female, these differences may be caused by the illnesses investigated and the recruitment setting. The mean duration of residency (∼20 years) is not unusual for people with a migration background in Germany.

Our study adds new insight to the importance of cultural sensitivity in healthcare provision. To the best of our knowledge, this is the first trial to examine the effects of cultural adaptation of PIMs beyond high-quality translation. Although there is a growing literature on the effects of culture-sensitive interventions in general,[32 33] studies have not usually been able to prevent performance bias (by blinding patients and GPs with regard to study group allocation). Moreover, language and other cultural aspects often confound interpretation. These two limitations did not apply to this trial.

Differences in usefulness of the PIMs found right after the consultation (T_1) were largely consistent over different study regions, illness type, migration backgrounds and level of symptom severity, although the moderation analyses are likely to have been underpowered to a certain degree. Nevertheless, we were able to demonstrate a large and stable moderating effect of acculturation with potentially far-reaching implications. Even if the identified effect is on average rather small (Cohen's

Table 4 Secondary outcomes

Outcome Time point	Estimated marginal means (SE)		Estimated mean difference		
	CS-PIM	ST-PIM	B	CI*	p Value†
Usefulness of information (USE)					
T_1	66.39 (1.67)	61.98 (1.73)	4.41	0.47 to ∞	0.03
T_2	63.89 (1.70)	60.43 (1.79)	3.46	−1.39 to 8.31	0.16
T_3	61.58 (1.78)	60.63 (1.85)	0.94	−4.08 to 5.97	0.71
Usefulness—cognitive (USE)					
T_1	23.22 (0.59)	22.44 (0.62)	0.78	−0.90 to 2.46	0.36
T_2	21.83 (0.61)	20.95 (0.64)	0.88	−0.85 to 2.61	0.32
T_3	21.26 (0.63)	21.30 (0.66)	−0.04	−1.83 to 1.76	0.97
Usefulness—emotional (USE)					
T_1	20.70 (0.64)	18.55 (0.67)	2.15	0.34 to 3.96	0.02
T_2	20.60 (0.66)	18.86 (0.69)	1.73	−0.14 to 3.60	0.07
T_3	19.73 (0.69)	19.12 (0.71)	0.61	−1.33 to 2.55	0.54
Usefulness—behavioural (USE)					
T_1	22.46 (0.59)	21.02 (0.61)	1.44	−0.23 to 3.11	0.09
T_2	21.55 (0.61)	20.64 (0.64)	0.92	−0.81 to 2.64	0.30
T_3	20.65 (0.63)	20.24 (0.66)	0.42	1.37 to 2.20	0.65
Symptoms—depression (PHQ-9)					
T_1	13.40 (0.82)	13.48 (0.85)	−0.08	−2.40 to 2.24	0.95
T_2	12.51 (0.85)	11.97 (0.86)	0.54	−1.85 to 2.93	0.66
T_3	11.53 (0.88)	12.23 (0.88)	−0.69	−3.14 to 1.75	0.58
Symptoms—back pain (core set)					
T_1	4.32 (0.13)	4.16 (0.13)	0.15	−0.20 to 0.51	0.40
T_2	4.18 (0.13)	4.04 (0.14)	0.14	−0.22 to 0.51	0.45
T_3	4.28 (0.13)	4.09 (0.14)	0.19	−0.19 to 0.58	0.32
Quality of life (WHO-5)					
T_1	10.32 (0.43)	10.13 (0.45)	0.19	−1.03 to 1.41	0.76
T_2	10.93 (0.44)	11.04 (0.46)	−0.11	−1.36 to 1.13	0.86
T_3	10.92 (0.45)	11.74 (0.47)	−0.82	−2.10 to 0.46	0.21

*Primary outcome: one-sided 95% CI, all other outcomes two-sided 95% CI.
†Primary outcome: one-sided test, all other outcomes two-sided tests.
B, mean difference; CS-PIM, culture-sensitive patient information material; PHQ-9, 9-item version of the Patient Health Questionnaire; SMAS, Stephenson Multigroup Acculturation Scale; ST-PIM, standard translated patient information material; T_1, time point 1 (after consultation); T_2, time point 2 (after 8 weeks); T_3, time point 3 (after 6 months); USE, Usefulness Scale for Patient Information Material; WHO-5, WHO-Five Well-Being Index.

d of 0.18), the pragmatic nature of the trial and high heterogeneity of the sample and interventions should be taken into account. Under these conditions, an effect has to be quite robust to cause a detectable difference. Moreover, the comparator (ie, the high-quality translation) should be considered an active control, which may additionally limit the size of the effect detected. In addition, the migrant groups in our study had a long history of migration and cultural exchange. Indeed, most of the patients in our sample had been living in Germany for nearly two decades, which may also have limited the size of the effects observed. The superiority of culturally adapting patient information materials is very likely to be considerably larger in patients with a lower level of acculturation, as suggested by our moderator analyses. Differences in usefulness of the PIMs diminished over time (T_2, T_3), which is probably caused by a decrease in intervention effect over time. We did not detect any effect on symptom severity or quality of life. Written PIMs are a useful adjunct to physician consultation and advice, and translation of PIMs is often the first step towards achieving culture-sensitive healthcare.[11] Our study has important practical implications, as we found reliable evidence that cultural adaptation of PIMs, compared with only high-quality translation, has additional benefits. The cost of adaptation, per PIM, was about €7500 in our study. Since PIMs can easily be reprinted and distributed, the costs of adaptation are marginal when produced in high print runs. Given the high potential to reach large numbers of patients at low cost, even a small effect may be clinically significant. Cultural adaptation should therefore be considered as a possible option to improve quality when developing PIMs for migrants, and clinicians should be encouraged to use them in their consultations, especially for migrants with low levels of acculturation.

Since we did not standardise the oral consultation, it seems highly likely that the effects of this face-to-face interaction masked the effect of the cultural adaptation. To detect effects of symptom severity or quality of life, a more standardised setting would probably be required. The provision of culturally adapted materials seems a

promising way of improving PIMs for people with a migration background, particularly in the group of recent immigrants with low levels of acculturation.

Author affiliations
[1]Department of Psychiatry and Psychotherapy, Medical Center—University of Freiburg, Freiburg, Germany
[2]Department of Medical Psychology, University Medical Center Hamburg-Eppendorf, Hamburg, Germany
[3]Department of Psychiatry and Psychotherapy, University of Leipzig, Leipzig, Germany
[4]German Depression Foundation, Depression Research Center, Leipzig, Germany
[5]Department of General Practice, Medical Center—University of Freiburg, Freiburg, Germany
[6]Staff Unit Board of Directors, Medical Center—University of Freiburg, Freiburg, Germany

REFERENCES

1. Statistisches Bundesamt, Fachserie 1, Reihe 2.2. Bevölkerung und Erwerbstätigkeit: Bevölkerung mit Migrationshintergrund—Ergebnisse des Mikrozensus 2014. Wiesbaden, 2015 (cited 2016 Aug 1). https://www.destatis.de/DE/Publikationen/Thematisch/Bevoelkerung/MigrationIntegration/Migrationshintergrund2010220147004.pdf?__blob=publicationFile
2. Sheikh A, Gatrad R, Dhami S. Consultations for people from minority groups. *BMJ* 2008;337:a273.
3. Wagner EH. Meeting the needs of chronically ill people. *BMJ* 2001;323:945–6.
4. Sheikh A. Ethnic minorities and their perceptions of the quality of primary care. *BMJ* 2009;339:b3797.
5. Worth A, Irshad T, Bhopal R, et al. Vulnerability and access to care for South Asian Sikh and Muslim patients with life limiting illness in Scotland: prospective longitudinal qualitative study. *BMJ* 2009;338:b183.
6. Griffiths C, Kaur G, Gantley M, et al. Influences on hospital admission for asthma in south Asian and white adults: qualitative interview study. *BMJ* 2001;323:962–6.
7. Rommel A, Saß AC, Born S, et al. [Health status of people with a migrant background and impact of socio-economic factors: first results of the German Health Interview and Examination Survey for Adults (DEGS1)]. *Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz* 2015;58:543–52. German.
8. Coulter A, Ellins J. Effectiveness of strategies for informing, educating, and involving patients. *BMJ* 2007;335:24–7.
9. Bodenheimer T, Lorig K, Holman H, et al. Patient self-management of chronic disease in primary care. *JAMA* 2002;288:2469–75.
10. Engers A, Jellema P, Wensing M, et al. Individual patient education for low back pain. *Cochrane Database Syst Rev* 2008;(1):CD004057.
11. World Health Organisation. *Health of migrants: the way forward. Report of a global consultation, Madrid, Spain, 3–5 March 2010*. Geneva: WHO Press, 2010 [cited 2016 Mar 2]. http://www.who.int/hac/events/consultation_report_health_migrants_colour_web.pdf?ua=1
12. Ingleby D. *Good practice in health service provision for migrants. Migration and health in the European Union*. Berkshire: Open University Press, 2011.
13. Benish SG, Quintana S, Wampold BE. Culturally adapted psychotherapy and the legitimacy of myth: a direct-comparison meta-analysis. *J Couns Psychol* 2011;58:279–89.
14. Bailey EJ, Cates CJ, Kruske SG, et al. Culture-specific programs for children and adults from minority groups who have asthma. *Cochrane Database Syst Rev* 2009;(1):CD006580.
15. Hawthorne K, Robles Y, Cannings-John R, et al. Culturally appropriate health education for type 2 diabetes mellitus in ethnic minority groups. *Cochrane Database Syst Rev* 2014;9:CD006424
16. Orleans CT, Boyd NR, Bingler R, et al. A self-help intervention for African-American smokers: tailoring cancer information service counseling for a special population. *Prev Med* 1998;27:S61–70.
17. Hölzel LP, Ries Z, Zill JM, et al. Development and testing of culturally sensitive patient information material for Turkish, Polish, Russian and Italian migrants with depression or chronic low back pain (KULTINFO): study protocol for a double-blind randomized controlled trial. *Trials* 2014;15:265.
18. Schenk L, Bau A-M, Borde T, et al. [A basic set of indicators for mapping migrant status. Recommendations for epidemiological practice]. *Bundesgesundheitsbl* 2006;49:853–60. German.
19. Bundesärztekammer (BÄK), Kassenärztliche Bundesvereinigung (KBV), Arbeitsgemeinschaft der Wissenschaftlichen Medizinischen Fachgesellschaften (AWMF). Nationale VersorgungsLeitlinie Kreuzschmerz—Langfassung, 1. Auflage, Version 5. zuletzt verändert: Oktober 2015. 2010 [cited 2 Mar 2016]. http://www.versorgungsleitlinien.de/themen/kreuzschmerz
20. DGPPN, BÄK, KBV, et al., eds. S3-Leitlinie/Nationale VersorgungsLeitlinie Unipolare Depression-Langfassung. 2009 [cited 2 Mar 2016]. http://www.depression.versorgungsleitlinien.de
21. Su CT, Parham LD. Generating a valid questionnaire translation for cross-cultural use. *Am J Occup Ther* 2002;56:581–4.
22. Edwards P, Roberts I, Clarke M, et al. Methods to increase response rates to postal questionnaires. *Cochrane Database Syst Rev* 2007;(2):MR000008.
23. Stephenson M. Development and validation of the Stephenson Multigroup Acculturation Scale (SMAS). *Psychol Assess* 2000;12:77–88.
24. Garner M, Ning Z, Francis J. A framework for the evaluation of patient information leaflets. *Health Expect* 2012;15:283–94.
25. Hölzel LP, Ries Z, Dirmaier J, et al. Usefulness scale for patient information material (USE)—development and psychometric properties. *BMC Med Inform Decis Mak* 2015;15:34.
26. Löwe B, Spitzer R, Zipfel S, et al. *Gesundheitsfragebogen für Patienten (PHQ D). Komplettversion und Kurzform. 2. Auflage*. Karlsruhe: Pfizer, 2002.

27. Mannion AF, Elfering A, Staerkle R, *et al.* Outcome assessment in low back pain: how low can you go? *Eur Spine J* 2005;14:1014–26.
28. WHO Regional Office for Europe. *Well-Being measures in primary health care: the Depcare Project. Report on a WHO Meeting.* Stockholm, Sweden, 1998 [cited 11 Feb 2016]. http://www.euro.who.int/__data/assets/pdf_file/0016/130750/E60246.pdf
29. Kriston L. Dealing with clinical heterogeneity in meta-analysis. Assumptions, methods, interpretation. *Int J Methods Psychiatr Res* 2013;22:1–15.
30. van Buuren S. Multiple imputation of discrete and continuous data by fully conditional specification. *Stat Methods Med Res* 2007;16:219–42.
31. Peugh JL, Enders CK. Using the SPSS mixed procedure to fit cross-sectional and longitudinal multilevel models. *Educ Psychol Meas* 2005;65:717–41.
32. Nierkers V, Hartman MA, Nicolaou M, *et al.* Effectiveness of cultural adaptations of interventions aimed at smoking cessation, diet, and/or physical activity in ethnic minorities. A systematic review. *PLoS ONE* 2013;8:e73373.
33. Chowdhary N, Jotheeswaran AT, Nadkarni A, *et al.* The methods and outcomes of cultural adaptations of psychological treatments for depressive disorders: a systematic review. *Psychol Med* 2014;44:1131–46.