

Quality Appraisal of Written Consumer Health Information for Patients with Chronic Myeloid Leukaemia (CML)

Final Report



Ludwig Boltzmann Institut
Health Technology Assessment

LBI-HTA Projektbericht Nr.: 052
ISSN: 1992-0488
ISSN-online: 1992-0496

Quality Appraisal of Written Consumer Health Information for Patients with Chronic Myeloid Leukaemia (CML)

Final Report



Ludwig Boltzmann Institut
Health Technology Assessment

Vienna, April 2012

Projektteam (Project team)

Projektleitung (Project leader): Katharina Hintringer, BA

Projektbearbeitung: Katharina Hintringer, BA

Projektbeteiligung (Additional contribution)

Internetsuche nach Patienteninformation (websearch for patient information): Jone Gerdvilaite, MA; Katharina Hintringer, BA

DISCERN-Bewertung der eingeschlossenen Patienteninformationsmaterialien (DISCERN-rating of the included patient information materials): Stefan Fischer; Katharina Hintringer, BA

Externe Begutachtung (External review): Dr. med. Holger Gothe, Dipl.-Komm.wirt

Interne Begutachtung (Internal review): PD Dr. Claudia Wild

Statistische Beratung (Statistical advice): Dipl.-Stat. Raffaella M. Gothe

Korrespondenz (Correspondence): Katharina Hintringer, katharina.hintringer@hta.lbg.ac.at

Dieser Bericht soll folgendermaßen zitiert werden/This report should be referenced as follows:

Hintringer K. Appraisal of the Quality of Written Consumer Health Information for Patients with Chronic Myeloid Leukaemia (CML) with the Standardised Quality Appraisal Instrument DISCERN. HTA- Projektbericht Nr. 53. 2012; Wien: Ludwig Boltzmann Institut für Health Technology Assessment.

Interessenskonflikt

Alle beteiligten AutorInnen erklären, dass keine Interessenskonflikte im Sinne der Uniform Requirements of Manuscripts Statement of Medical Journal Editors (www.icmje.org) bestehen

Conflict of Interest

All contributing authors declare that they have no conflicts of interest according to the Uniform Requirements of Manuscripts Statement of Medical Journal Editors (www.icmje.org)

DISCLAIMER

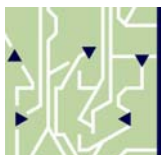
This study report is a product of a master thesis conducted within the study programme 'Magisterstudium Gesundheitswissenschaften' at UMIT – University for Health Sciences, Medical Informatics and Technology in Hall i.T., Austria.

CONTACT INFORMATION

Publisher:

Ludwig Boltzmann Gesellschaft GmbH
Nußdorferstr. 64, 6. Stock, A-1090 Wien
<http://www.lbg.ac.at/de/lbg/impressum>

Responsible for Contents:



Ludwig Boltzmann Institut für Health Technology Assessment (LBI-HTA)
Garnisongasse 7/20, A-1090 Wien
<http://hta.lbg.ac.at/>

Project reports of the LBI-HTA do not appear on a regular basis and serve to publicize the research results of the Ludwig Boltzmann Institute of Health Technology Assessments. Project reports of the LBI-HTA are only available to the public via the Internet at "<http://eprints.hta.lbg.ac.at/>":

LBI-HTA Projektbericht Nr.: 052
ISSN: 1992-0488
ISSN-online: 1992-0496

© 2012 LBI-HTA – Alle Rechte vorbehalten

Table of Contents

Table of Contents.....	3
List of Figures.....	4
List of Abbreviations.....	5
Abstract.....	7
Zusammenfassung.....	8
1 Background.....	9
1.1 The Role of Written Patient Information in the Field of Shared Decision Making.....	9
1.2 The Role of Written Patient Information in Hemato-Oncology.....	10
1.3 Chronic Myeloid Leukaemia – Burden of Disease.....	12
1.4 Chronic Myeloid Leukaemia – Therapy Options.....	13
1.5 Quality of Written Health Information.....	14
1.6 Quality Assessment of Written Health Information.....	18
2 Research Question and Aim.....	21
3 Methods.....	23
3.1 Identification of Materials: Search Strategy.....	23
3.2 Quality Assessment – DISCERN Instrument.....	24
3.3 Statistical Analysis.....	25
4 Results.....	27
4.1 Selection of Written Consumer Health Information for Quality Assessment.....	27
4.2 Overall Characteristics of Included Information Materials.....	29
4.3 Overall DISCERN Results.....	36
4.4 DISCERN Score According to Characteristics of Information Materials.....	38
5 Discussion.....	41
6 Conclusion.....	45
7 Limitations.....	47
8 Outlook.....	49
9 References.....	51
10 Appendix.....	55

List of Figures

Figure 1-1: Monitoring the response to imatinib according to the European LeukemiaNet Recommendations [19]	13
Figure 1-2: Quality criteria for health-related websites according to the policy paper by eEurope 2002 [38].....	16
Figure 4-1: Selection process of written CHI materials on CML for the quality assessment with the standardized instrument DISCERN.....	28
Figure 4-2: Overall rating (DISCERN question 16) of the information material as a source for information about treatment options.....	37
Figure 4-3: DISCERN rating (min 15 to max 75) based on questions 1 to 15 according to type of information provider.....	39
Figure 10-1: Distribution of the overall DISCERN rating across included information materials.....	60

List of Tables

Table 4-1: Included patient information materials in alphabetical order of the information providers	30
Table 4-2: Overview of quality labels displayed on the websites of the information providers of the included materials.....	34
Table 4-3: Combined results of the sixteen DISCERN questions based on all 33 information materials.....	36
Table 4-4: Information materials according to categories of DISCERN ratings and information provider.....	38
Table 4-5: Comparison of the mean DISCERN score by characteristics of the information materials.....	40
Table 10-1: List of institutions contacted directly for written patient information on CML.....	55

List of Abbreviations

ABL	tyrosine kinase gene abelson at chromosome 9
ADAGIO	Adherence Assessment with Glivec: Indicators and Outcomes
AFGIS	Aktionsforum Gesundheitsinformationssysteme
AMRC	Association of Medical Research Charities
BCR	break-point cluster gene at chromosome 22
CCyR	complete cytogenetic response
CHI	consumer health information
CHR	complete hematologic response
CML	chronic myeloid (myelogenous) leukemia
CMR	complete molecular response
EBPI	evidence-based patient information
ELN	European LeukemiaNet
EMA	European Medicines Agency
EU	European Union
FRSB	Fund Raising Standards Board
HON	Health on the Net
HS_E/W	handsearch e-mail/website
H SCT	hematopoietic stem cell transplantation
IFN- α	interferon-alpha
IPDAS	International Patient Decision Aids Collaboration
MMR	major molecular response
NCCN	National Comprehensive Cancer Center
Ph+	Philadelphia chromosome positive

Abstract

Background

Freely available and easily accessible (e.g. via the internet) written consumer health information (CHI) plays an increasingly important role in the treatment decision process between patients and their health-care professionals. Criteria describing the quality of CHI have already been defined. However, there is criticism that they are not yet comprehensively addressed within existing CHI. This study aims at assessing the quality of written CHI about treatment options for chronic myeloid leukaemia (CML).

Methods

Written CHI materials were identified by an internet search in 3 search engines and organisations (n=118) potentially offering written CHI on CML were directly contacted and asked to provide their patient information materials. Additionally, their websites were screened for relevant materials. The structural quality of the included materials was assessed with the standardised quality appraisal instrument DISCERN by two independent raters.

Results

33 patient information materials about CML and its treatment options were included. The overall mean DISCERN rating (absolute rating based on questions 1-15: min 15 to max 75) was 44.12 (range 24 to 65, SD 11.49) and the overall mean DISCERN score (mean rating based on questions 1-15: min 1 to max 5) was 2.94 (SD 0.766). Mean DISCERN scores show a statistically significant discrepancy in quality of the materials between the different types of information providers ($p=0.012$) but not between providers presenting a quality certification on their website and those without a quality label ($p=0.385$).

Conclusion

These results confirm that available CHI does not sufficiently meet existing quality criteria for patient information. Especially materials offered by commercial organisations have significantly lower DISCERN ratings than those offered by non-profit organisations. Astonishingly, materials of providers approved by quality labels such as Health-on-the-Net (HON), which claim to set apart trustworthy from non-trustworthy websites (e.g. potential for commercial influence), do not demonstrate higher quality than materials by providers without any quality labels.

Keywords

written patient information, consumer health information, CHI, chronic myeloid leukaemia, CML, shared decision making, SDM, DISCERN, quality appraisal

Zusammenfassung

Hintergrund

Neben dem Arzt-Patienten-Gespräch spielen frei verfügbare schriftliche Patienteninformationen für eine partizipative Entscheidungsfindung bei Behandlungsentscheidungen eine immer größere Rolle. Obwohl Kriterien für evidenzbasierte Patienteninformation verfügbar sind, werden diese bislang nur unzureichend berücksichtigt. Ziel der vorliegenden Studie ist es, die Qualität schriftlicher Patienteninformation zu evaluieren und Ansatzpunkte für die Qualitätsverbesserung zu finden.

Methoden

Zur Identifizierung von gebräuchlichen Patienteninformationen wurde eine Internetsuche in 3 Suchmaschinen durchgeführt. Zusätzlich wurden relevante Organisationen und Institutionen (n=118) sowohl direkt angeschrieben als auch deren Websites durchsucht. Die Bewertung der strukturellen Qualität der eingeschlossenen Patienteninformationen wurde von zwei unabhängigen Ratern anhand des standardisierten Qualitätsbewertungsinstrumentes DISCERN durchgeführt.

Resultate

33 Informationsmaterialien zu CML und deren Behandlungsoptionen wurden eingeschlossen. Das mittlere DISCERN-Rating war (absolutes Rating der Fragen 1-15: Minimum 15 bis Maximum 75) 44,12 (Spannweite 24-65, SD 11,49) und der mittlere DISCERN-Score (mittleres Rating der Fragen 1-15: Minimum 1 bis Maximum 5) war 2,94 (SD 0,766) für alle 33 eingeschlossenen Informationsmaterialien. Der mittlere DISCERN-Score variiert statistisch signifikant zwischen der Art der Informationsersteller ($p=0,012$) aber nicht zwischen Organisationen, die ein Qualitätszertifikat auf ihrer Homepage anzeigen, im Vergleich zu denen, die kein Qualitätslabel haben ($p=0,385$).

Fazit

Diese Ergebnisse bestätigen, dass derzeit verfügbare Gesundheitsinformationen nur unzureichend bestehenden Qualitätskriterien entsprechen. Vor allem Informationsmaterialien von auf Gewinn ausgerichteten Organisationen haben statistisch signifikant niedrigere DISCERN-Ratings als jene von Non-Profit-Organisationen. Erstaunlicherweise konnte kein Qualitätsunterschied zwischen Materialien von Organisationen mit einem Qualitätslabel, wie zum Beispiel Health on the Net (HON), auf deren Homepage im Vergleich zu Organisationen ohne einem derartigen Qualitätszertifikat festgestellt werden.

Schlüsselwörter

Schriftliche Patienteninformation, Gesundheitsinformation, chronisch myeloische Leukämie, CML, Shared Decision Making, SDM, DISCERN, Qualitätsbewertung

1 Background

1.1 The Role of Written Patient Information in the Field of Shared Decision Making

Written patient information is regarded as an essential component of shared decision making (SDM) on diagnostic and therapeutic options. Studies show that within the last 10 years, the information behaviour of patients (and their relatives) regarding health issues has changed substantially. 80-90% of patients search by themselves in traditional media, the internet, via patient organisations or health insurers for specific or general health information [1]. Especially patients suffering from chronic disease and their relatives search proactively for health information additional to the information provided to them by health care professionals in order to obtain more certainty about their condition and the decision(s) related to their health problem [2, 3]. One important prerequisite for informed SDM is the availability of evidence-based information, which has been written for patients and lay audience [4]. Despite the definition of evidence-based patient information (EBPI) [5, 6], it is criticized that the components of EBPI (e.g.: natural course of the disease, available treatment options including their benefits and risks and also including the option of doing nothing, etc.) are not yet comprehensively addressed within existing patient information materials [4].

written patient information is an essential component of SDM

Patient information is not solely intended to be a service for patients or to support SDM. The Pharmaceutical Forum, an initiative of the European Commission, describes the value of accessible high-quality patient information within various aspects of the health care setting and lists the following reasons on the importance of consumer health information for patients [7]:

patient information is more than a service; it enhances informed decisions and aims to improve health overall

- *“Enhance their ability to make informed decisions about optimal disease management and prevention in full partnership with health care professionals;*
- *Optimise health outcomes through improved treatment concordance based on the belief that the more patients are informed, the better they understand their treatment and in particular how medicines must be taken;*
- *Make more effective and rationale use of the therapies that are available;*
- *Increase their awareness of benefits and risks of medicines and the importance of reporting and managing possible side effects and adverse reactions;*
- *Improve patients’ quality of life by adopting preventive measures, seeking earlier diagnosis, recovering faster from illness, avoiding hospitalisation and invasive surgery where possible, and enabling patients to continue their normal daily routines.” [7]*

barriers to access high-quality patient information ...
... e.g. health literacy

WHO definition of health literacy

patient information to support empowerment of patients

These recommendations point out that the mere availability of patient information is not enough to ensure informed SDM and educated patients. Considering the known barriers for patients to access high-quality patient information (e.g. health literacy, time available, state of mind, confidentiality and lack of information / too much information), the Pharmaceutical Forum encourages EU member states to develop strategies to overcome these barriers in order to improve health outcomes [7]. Within this context, access to high-quality patient information has to be seen as one part of a process to improve health care overall and to strengthen health literacy. The World Health Organisation defines health literacy as the *“achievement of a level of knowledge, personal skills and confidence to take action to improve personal and community health by changing personal lifestyles and living conditions”* [8]. This also includes strategies to facilitate access to high-quality and validated information, to raise awareness of what patients can and should expect from their health care professionals and to promote the information and communication process between both, the different health settings and the human contact between patients and their health professionals [7]. At this point it has to be noted that written patient information does not only play an important role in SDM, but is also very important in the context of health literacy in order to empower patients to make appropriate health decisions based on written or oral health care information. The concept of health literacy also encompasses the ability of people to access health information and their capacity to use the obtained information effectively [9, 10].

1.2 The Role of Written Patient Information in Hemato-Oncology

reliable information is particularly important in fields with multiple diagnostic and / or therapeutic options

e.g. in stratified medicine

development of new drugs has changed treatment management

Particularly in fields where multiple diagnostic and therapeutic options are available, reliable information for the patients to support the discussion with the physician about the most appropriate treatment choice is necessary. For instance, in oncology, stratified medicine has become more and more important over the last 20 years. For decades, intravenously administered cytotoxic chemotherapy was the standard of care for various cancer entities [11]. With the increased understanding of the mechanisms underlying a disease, drugs that specifically target the molecules involved in the growth of e.g. cancer cells, were developed to bind to these molecules and stop further growth or even lead to apoptosis [12]. Targeted therapies are often less toxic than traditional chemotherapy, as they interfere with specific molecules and not primarily through inhibition of cell division, which also affects healthy cells (e.g. hair, gastrointestinal epithelium, bone marrow) [11].

The development and approval of targeted therapies has substantially changed the treatment management for some diseases. Further, the mode of application of the therapy is relevant for patients with respect to the extent to which therapy influences their daily life not only in terms of effectiveness and safety, but also whether they can take their medication by themselves at home or if they have to see a physician regularly or even stay in hospital during treatment. Two of the main types of targeted agents are small molecule inhibitors and monoclonal antibodies [11, 12]. Small molecule inhibitors such as imatinib or erlotinib are administered orally and can thus be given in an outpatient setting, whereas monoclonal antibodies like rituximab and

bevacizumab are administered intravenously in the hospital. Although the majority of cancer patients (>80%) prefer oral therapy over intravenous therapy due to the convenience of receiving treatment at home, avoidance of venepunctures, a greater sense of “control” over their treatment and better quality of life, there are concerns regarding the administration of therapy in this form. Specifically, oral administration of these medications is often associated with reduced effectiveness of treatment due to poor adherence, inadequate monitoring of adverse events and limited support of the patients by their oncology care team due to reduced contact [13]. In order to manage these challenges, education of both the patient and the oncology care team is essential [13, 14]. With the implementation of the new “innovative” drugs and the traditional therapy options still available, the question arises which of the treatment possibilities to choose for which patient and based on what kind of information patients have to decide together with their physicians on a specific treatment option. Without access to good-quality information about the therapy options and their benefits and harms, the advantages and disadvantages, patients will not be able to make informed choices regarding the therapy [15, 16].

Nowadays, since SDM is an essential component in the treatment management of patients, especially in chronically ill patients, it should be safe to assume that information about these advances in medical research and treatment is also provided to patients by reliable high-quality information to support decision making with their health professional. One example for the importance of SDM is chronic myeloid leukaemia (CML), a non-curable, complex and chronic disease with a variety of treatment options available. For a long time, chemotherapy and hematopoietic stem cell transplantation (HSCT) have been the standard of care in CML treatment showing, however, limited effectiveness [17]. In 2001, CML therapy was revolutionised with the approval of imatinib mesylate, a tyrosine kinase inhibitor (TKI), which improved the 5-year overall survival rates from 53% to 89% [18]. Within the last five years, two further TKIs for the treatment of CML have been approved. With the approval of these three small molecule inhibitors (imatinib mesylate, dasatinib and nilotinib) and the former treatment options (e.g. HSCT, therapy with interferon-alpha (IFN- α) or hydroxyurea [19]), there is now a range of treatment options available, each accompanied by a variety of advantages and disadvantages [20-23]. Adequate information materials on these treatment options would enable patients suffering from CML to be well-informed and therefore participate actively in their treatment management process. Information may foster the awareness regarding the challenges of living with CML and the advantages, as well as the disadvantages of the therapy. This is why written patient information materials may be useful to support SDM between the oncology care team and the patient. Research in the field of high-quality patient information claims that quality criteria already defined are not yet comprehensively addressed within existing patient information materials. Therefore, this study aims to assess the structural quality of written patient information about CML and its treatment options.

In the following paragraphs, a brief overview of the disease CML itself and the advantages and disadvantages of the available treatment options will be given. Further, it will be pointed out which parameters determine “quality” of written consumer information and how said quality can be assessed.

mode of administration of a drug is important for patients

oral administration preferred over i.v. administration

SDM is an essential component in the treatment management of patients with chronic disease

e.g. with CML

development of new drugs (imatinib, dasatinib, nilotinib)

prior treatment options still available

question arises which therapy to choose

reliable information is required to support choice of therapy

1.3 Chronic Myeloid Leukaemia – Burden of Disease

leukaemia is a blood disorder	Leukaemia is a blood disorder, resulting from abnormal (not mature) white blood cells. Risk factors that are assumed to increase the risk of getting leukaemia are exposition to certain chemicals, ionising radiation, cytostatics and genetic disposition [24]. Annually, about 12.5 per 100,000 habitants are diagnosed with leukaemia in the United States [25]. The classification of leukaemia depends mainly on the clinical course of the disease, maturity level and origin of the pathologically abnormal white blood cells. The two main differentiations are either chronic or acute leukaemia or lymphocytic or myeloid leukaemia. Thus, the four main types of leukaemia are acute myeloid leukaemia (AML), acute lymphocytic leukaemia (ALL), chronic myeloid leukaemia (CML) and chronic lymphocytic leukaemia (CLL) [26].
overall: four different types of leukaemia (AML, ALL, CML, CLL)	
CML accounts for approximately 15-20% of all leukaemia patients	CML is also known as chronic myelocytic, chronic myelogenous or chronic granulocytic leukaemia. It accounts for approximately 15% to 20% of all leukaemia cases and affects 1 to 2 persons per 100,000 habitants in the general population. Median age at diagnosis is 50 to 60 years [27, 28]. CML can generally be divided into three phases: the chronic phase, the accelerated phase and the blast crisis. When diagnosed in the chronic phase and if left untreated, CML will progress to the accelerated phase and subsequently to the blast crisis, which inevitably ends fatally, over the course of 3 to 5 years [18]. Since the introduction of imatinib in newly diagnosed CML patients, the 5-year survival rate has increased substantially [18]. Approximately 85% of patients present a chronic phase of the disease and 20% to 50% are even asymptomatic at time of diagnosis [28]. Among patients diagnosed with symptomatic disease, systemic symptoms such as fatigue, malaise, weight loss, excessive sweating, abdominal fullness and bleeding episodes due to platelet dysfunction are commonly observed [28].
divided into 3 phases: chronic, accelerated and blast crisis	
85% of patients present with chronic phase of the disease at diagnosis	
>90% of CML patients are Ph+	All patients suffering from CML demonstrate the fusion gene BCR-ABL [24] and >90% of CML patients have Philadelphia chromosome positive (Ph+) disease [29, 30]. The Philadelphia chromosome is generated by a reciprocal translocation and fusion between the tyrosine kinase gene abelson (ABL) at chromosome 9 and the break-point cluster (BCR) gene at chromosome 22 and leads to altered cellular adhesion, activation of mitogenic signalling and inhibition of apoptosis and thereby to the transformation of hematopoietic stem cells. Ph+ cells are also referred to as BCR-ABL1 fusion genes [29]. The discovery of the Ph+ chromosome in 1960 and its tyrosine kinase activity has lead to the development of tyrosine kinase inhibitors (TKIs) in order to selectively inhibit the aberrant BCR-ABL tyrosine kinase and thus to significantly reduce the Ph+ CML cells [29].
discovery of the Ph-chromosome has lead to the development of TKIs	
risk scores of prognostic relevance	Besides the three CML stages, the determination of risk scores also is of prognostic relevance and is important for the treatment management of CML patients [28, 30]. Two widely used scoring systems, the Sokal and the Hasford score, categorise patients into low-, intermediate- or high-risk patients. The Sokal score takes a patient's age, spleen size, platelet counts and percentage of blast cells in the peripheral blood into account and was developed in patients receiving chemotherapy [30]. Additionally to the parameters of the Sokal score, the Hasford score takes into account basophils and eosinophils. It was established based on data gathered from patients treated with interferon [28, 30].
Sokal score and Hasford score	

1.4 Chronic Myeloid Leukaemia – Therapy Options

In 2001, the first BCR-ABL TKI, imatinib mesylate (IM; Gleevec® / Glivec®) was approved by the European Medicines Agency (EMA) [31] and the US Food and Drug Administration (FDA) [32] for the treatment of CML [29] and has led to improved 5-year survival rates [18]. Within the last 10 years, imatinib became the standard of care for the treatment of CML. In 2010, two further TKIs, nilotinib (Tasigna®) and dasatinib (Sprycel®), which demonstrated promising results in clinical trials, were approved for first-line treatment of CML. All three TKIs have a category 1 recommendation as first-line agents for the treatment of CML in the chronic phase [30]. Long-term follow-up data on efficacy and safety of the two new second-generation TKIs, nilotinib and dasatinib, are not yet available. Thus, their role in the first-line treatment of CML has not yet been finally established [30]. Currently, the stage of the disease, differences in the toxicity profiles of the three TKIs and BCR-ABL kinase domain mutation status of the disease are relevant for the choice of the potentially most effective TKI for a particular patient [19, 30]. There is one known mutation, T315I, all TKIs are resistant to. For patients with the T315I mutation, HSCT or enrolment into a clinical trial are the first-line therapies of choice. Further details about BCR-ABL kinase domain mutations and treatment recommendations are available in the National Comprehensive Cancer Network (NCCN) Clinical Practice Guideline [30] or in the recommendations for CML management by the European LeukemiaNet (ELN) [19].

For an effective treatment management, the response and resistance to TKI therapy have to be carefully monitored in order to switch to different therapy options in case of treatment failure or suboptimal response. The three different response types monitored are hematologic, cytogenetic and molecular response with the goal to achieve complete hematologic response (CHR), complete cytogenetic response (CCyR), major molecular response (MMR) and complete molecular response (CMR) followed by each other in order of time [29, 30]. The ELN provides definitions of response to therapy and recommends the intervals depicted in Figure 1-1 for monitoring the response [19].

in 2001 the first TKI for the treatment of CML was approved ...

... and has led to an increase in 5-year survival rates

in 2010, two further TKIs were approved for the treatment of CML

the question arises which of the treatment options to choose

careful monitoring of response and resistance to TKIs is essential for an effective treatment management

Response	Description of Monitoring
Hematologic	At diagnosis, then every 15 days until CHR has been achieved and confirmed, then at least every 3 months or as required
Cytogenetic	At diagnosis, at 3 months, and at 6 months; then every 6 months until a CCyR has been achieved and confirmed, then every 12 months if regular molecular monitoring cannot be assured; always for occurrences of treatment failure (primary or secondary resistance), and for occurrences of unexplained anemia, leukopenia, or thrombocytopenia
Molecular by RT-Q-PCR	Every 3 months until MMoR has been achieved and confirmed, then at least every 6 months
Molecular by mutational analysis	In occurrences of suboptimal response or failure; always required before changing to other TKIs or other therapies

NOTE. Cytogenetics should be performed by chromosome banding analysis of marrow cell metaphases until CCyR has been achieved and confirmed. Interphase fluorescent in situ hybridization cannot be used to assess a less-than-complete response, but it can substitute for chromosome banding analysis to monitor the completeness of a CCyR, provided that BCR-ABL1 extrasignal, dual color, dual fusion, or in situ hybridization probes are used and that at least 200 nuclei are scored.
135-137

Abbreviations: CHR, complete histologic response; CCyR, complete cytogenetic response; RT-Q-PCR, real-time quantitative polymerase chain reaction; MMoR, major molecular response.

Figure 1-1: Monitoring the response to imatinib according to the European LeukemiaNet Recommendations [19]

response evaluation is based on data collected with imatinib therapy ...
... questionable if these intervals are also valid in nilotinib or dasatinib therapy

compliance might influence the effectiveness of oral TKI therapy

patients not responding to initial therapy should switch to another TKI, HSCT or be enrolled in a clinical trial

These intervals (Figure 1-1) are based on data collected in the course of imatinib treatments. As responses to nilotinib and dasatinib are more rapid, response testing is suggested to be done earlier and more frequently [19]. According to the NCCN guidelines, most patients who receive a TKI show complete hematologic response at 3 months and complete cytogenetic response at 6, 12, or 18 months. In those patients who do not achieve hematologic or cytogenetic response by these intervals, molecular analysis should be performed and the compliance of patients with the orally administered TKIs should be evaluated [30]. According to the ADAGIO (Adherence Assessment with Glivec: Indicators and Outcomes) study, adherence is the only independent predictive factor with regard to achieving complete molecular response [33]. Thus, patient education on adherence and appropriate management and monitoring of adverse events is recommended in order to help to improve patients' adherence to therapy and thus effectiveness of therapy [30].

In patients who do not achieve a hematologic or cytogenetic response by the above mentioned intervals, switching to another second-generation TKI, HSCT or enrolment in a clinical trial should be considered [30]. Whereas HSCT is currently the only potentially curative therapy for CML, it is not recommended as initial therapy due to its substantial risk of mortality and late morbidity (e.g. graft-versus-host disease). HSCT is recommended when drug therapy failed or in patients in advanced stages of the disease [19, 30].

1.5 Quality of Written Health Information

various information providers produce various types of information materials

availability and access to patient information does not necessarily mean that this information is of importance ...

... might be incomplete, inaccurate and/or misleading

"quality" of a patient information material is highly dependent on the needs of the patients

Written consumer health information or patient information is available from different sources and different types such as brochures, flyers or websites launched by various information providers. People interested in health information and access to the World Wide Web will face a wide variety of health information from different known and unknown sources and offered by various known and unknown information providers. Having access to all that information does not mean that those searching for information will find the information they require for their individual health question, as information provided may be sometimes incomplete, inaccurate and/or misleading [15]. Potential reasons for this are that the information provider itself does not have the competences to create transparent and complete information materials or that the provider is simply more interested in convincing the patient to opt for a certain product/health service rather than in providing unbiased, accurate and complete information as consumers would expect [34]. Thus, the key question remains which information materials patients can rely on and how to assure the quality of the provided information.

"Quality" of written consumer health information can neither be described by one sentence, nor can one single description be valid for all the different types of consumer health information available. For example, the information needs of patients who face the decision of whether to participate in a screening program or not are different from the information needs of patients diagnosed with a chronic, non-curable disease with several life-long treatment options [35]. One thing both cases have in common is that patients somehow have to make a decision: whether they want to participate in the screening program or which therapy option they would like to choose. This decision making process can be supported by discussion with health

care professionals and can also be complemented by high-quality written consumer health information.

In 1998, Eysenbach and Diepgen published a paper discussing the “quality” of consumer health information. Referring to the International Organization for Standardization, Technical Committee 176 (ISO/TC 176), they defined “quality” as *“the totality of characteristics of an entity that bear on its ability to satisfy stated and implied needs”* [36]. Further, they state that, in order to evaluate the quality of health information on the internet, *“these needs have to be defined and translated into a set of quantitatively and qualitatively stated requirements for the characteristics of an entity that reflect the stated and implied needs”* [37].

Thereafter, international working groups have put an effort into translating this “need” into a set of criteria which can be used to define the quality of written consumer health information and have further developed several checklists for the quality assessment of written consumer health information (see chapter 1.6) [35]. A lot of research on the quality of health information is still ongoing in order to help health consumers distinguish trustworthy from non-trustworthy consumer health information [4, 6].

In 2002, a policy paper on “Quality Criteria for Health related Websites”, a core set of quality criteria was developed and published by a working group initiated by the European Council within the initiative eEurope2002. According to this group, health-related websites have to meet several criteria in six different categories: transparency and honesty, authority, privacy and data protection, updating of information, accountability, accessibility [38]. A description of these six categories as provided by eEurope2002 is depicted in Figure 1-2.

definition of the “quality” of consumer health information (CHI)

criteria and checklists for assessing and determining the quality of CHI have been established

quality criteria are grouped into different categories (e.g.: transparency and honesty, accountability, accessibility)

<p>Developed in widespread consultation with representatives of private and public eHealth websites and information providers, other industrial representatives, public officials, and representatives of government departments, international organisations, and non-governmental organisations. These criteria should be applied in addition to relevant Community law</p> <p>Transparency and Honesty</p> <ul style="list-style-type: none"> • Transparency of provider of site - <i>including</i> name, physical address and electronic address of the person or organisation responsible for the site (see Article 5 and 6 Directive 2000/31/EC on Electronic Commerce). • Transparency of purpose and objective of the site • Target audience clearly defined (further detail on purpose, multiple audience could be defined at different levels). • Transparency of all sources of <i>funding</i> for site (grants, sponsors, advertisers, non-profit, voluntary assistance). <p>Authority</p> <ul style="list-style-type: none"> • Clear statement of sources for all information provided and date of publication of source. • Name and <i>credentials</i> of all human/institutional providers of information put up on the site, including dates at which credentials were received. <p>Privacy and data protection</p> <ul style="list-style-type: none"> • Privacy and data protection policy and system for the processing of personal data, including processing invisible to users, to be clearly defined in accordance with community Data Protection legislation (Directives 95/46/EC and 2002/58/EC). <p>Updating of information</p> <ul style="list-style-type: none"> • Clear and regular updating of the site, with date of up-date clearly displayed for each page and/or item as relevant. Regular checking of relevance of information. <p>Accountability</p> <ul style="list-style-type: none"> • <i>Accountability</i>- user feedback, and appropriate oversight responsibility (such as a named quality compliance officer for each site). • Responsible partnering - all efforts should be made to ensure that partnering or linking to other websites is undertaken only with trustworthy individuals and organisations who themselves comply with relevant codes of good practice. • Editorial policy - clear statement describing what procedure was used for selection of content. <p>Accessibility</p> <ul style="list-style-type: none"> • <i>Accessibility</i>- attention to guidelines on physical accessibility as well as general findability, searchability, readability, usability, etc. <p>Relevant Community Law is listed in reference 3. Terms <i>in italics</i> are further discussed in the Glossary of Terms.</p>	
--	--

Figure 1-2: Quality criteria for health-related websites according to the policy paper by eEurope 2002 [38]

a working group of the European Commission also defined a set of core quality principles

Another European initiative, the Pharmaceutical Forum set up by the European Commission, also provided a set of core quality principles stating that patient information has to be objective and unbiased, patient-oriented, evidence-based, up-to-date, reliable, understandable, accessible, transparent, relevant and consistent with statutory regulation of the EU member states [39]. In order to facilitate the implementation of these core principles in patient information materials and to prevent promotional orientation thereof, a guiding framework including clear and reproducible criteria for each principle has been developed [40].

overall, quality criteria address

Other working-groups developed different sets of criteria to determine the quality of written consumer health information that generally addressed the questions of reliability of the information material and how good the information was in terms of balanced presentation of benefits and harms, description of the intervention, natural course of disease or how the intervention would affect a patient's quality of life [15, 41]. Others again focused on assessing the authorship of the content, attribution to the sources of content, disclosure of sources of funding and competing interests and timeliness of information provided [34].

all initiatives look at meta-information

Although all of these initiatives created different sets of criteria, they have in common that they look at both, the so-called meta-information (authors, sponsor, financial dependence, aim of the publication, information sources, up-to-dateness of the information, statement of addresses for further information on specific topics and support organisations) and the content of the information material (aim of the intervention, what would happen if the in-

tervention was not given/refused, different treatment options, presentation of benefits and harms, etc.) [5].

During the past decade, the term “evidence-based patient information (EBPI)” became more and more important [5, 6]. Proponents of EBPI claim that existing criteria for quality evaluation and supporting tools are not able to assess the quality of patient information, as their focus primarily lies on assessing the structure and meta-information of information materials rather than on assessing the accuracy of information, way of presentation of the information or development process of the materials [5]. For example, EBPI looks at the way risks are communicated to patients – are they solely shown as words/numbers within the text or are risks shown as graphical illustrations and, if yes, are relative or absolute risks presented [42, 43]. Further, it is looked at the “reading ease” – is the level of the language used appropriately chosen for the target group defined upfront? Other questions focus on the level of the evidence used to develop the health information material – is it explicitly stated? Does the information tell us what we do not yet know and are the benefits and risks balanced and accurate? On the other hand, there is not yet certainty about what can be expected of EBPI. Thus, Steckelberg et al. (2005) [5] and Bunge et al. (2010) [6] conducted a systematic review on quality criteria for EBPI and suggest the following pool of categories as essential quality criteria for EBPI:

1. Content of information and meta-information
2. Quality of evidence
3. Patient-oriented outcome measures
4. Presentation of numerical data
5. Verbal presentation of risks
6. Diagrams, graphics and charts
7. Gain and loss framing
8. Pictures and drawings
9. Patient narratives
10. Cultural aspects
11. Layout
12. Language
13. Development process

The authors referred to above summarize that gathering these categories was a first step in defining EBPI. Some of these categories are supported by high-evidence level literature and some of them lack high-evidence level research. For now, this set of criteria can be used as a guide for developers of EBPI. Future research in this field could focus on conducting studies that fill the gaps in high-level evidence and to develop a comprehensive guide to develop EBPI and a validated instrument for assessing EBPI [44].

proponents of EBPI claim that existing quality criteria are not able to assess the quality of written CHI

EBPI focuses for example on the way risks are communicated, the “reading ease” of a text, what is the level of evidence used to create the CHI etc.

systematic review to identify quality criteria for EBPI

evidence to back the importance of these criteria is heterogeneous

1.6 Quality Assessment of Written Health Information

several approaches to assess the quality of written patient information (e.g. quality labels or codes of conducts such as HON)

information providers actively seek for quality certification

if they comply with the criteria of the quality label they are allowed to present the label at their website

quality labels are tools to give hints about the trustworthiness of information providers

another approach is to use checklists developed to assess the quality of information

DISCERN, a standardized and validated instrument

Check-In: developed based in **DISCERN** and **AGREE** currently not validated

Generally, there are several possible ways of how to assess the quality or trustworthiness of consumer health information. The easiest and less time-consuming way is to rely on codes of conducts, so called quality labels, seals or logos such as Health on the Net (HON), “Aktionsforum Gesundheitsinformationssysteme” (AFGIS) or “The Information Standard”. These codes of conducts have been developed by third-party organisations and are aimed to set apart trustworthy from non-trustworthy information sources [35, 38, 45-48]. Owners of websites can apply for these certifications. If they are compliant with the predefined criteria, the owners of the websites are allowed to put the corresponding quality logo on their website for a certain period of time after which they have to apply for re-examination by the third-party organisation in order to keep the certification up-to-date. But the mere availability of a quality seal on a website does not necessarily mean that the website has been approved by the provider of the quality seal. Thus, it is advisable to click on the logo, which is active when approved and links to the provider of the quality label. There, consumers have access to the information whether the certification is up-to-date and when the certification will expire. For example, a click on an active HON label opens a new page where details such as first HON approval, renewal of approval and approval duration or re-examination status are listed. This service enables health consumers to check whether the site displaying the quality seal is compliant with the quality criteria of the label or not [38]. Tools like HON or AFGIS have been developed as quality labels and give consumers hints about the trustworthiness of the website. In this connection, the criteria for the certification consider solely the structural quality of the information provider, but not the content of the website [35, 38].

Another, more sophisticated approach to assess the quality of consumer health or patient information is to use tools or checklists developed to assess the quality of written consumer health information [5, 6, 35, 49]. These checklists can either be used as a guide for the development of health information or to assess existing information by health consumers themselves or by scientists for research purposes. Despite the existence of multiple tools and criteria, there is no generally accepted gold standard defined for the appraisal of the quality of written consumer health information [35].

To give an overview of the variety of the available instruments, some of them are briefly described below with their main characteristics:

DISCERN was the first standardised and validated instrument that was developed for the quality appraisal of written consumer health information. It enables consumers and information providers to assess the structural quality of written consumer health information on different treatment choices [15, 35].

Check-In was developed based on **DISCERN** and **AGREE** (a checklist developed to assess the quality of clinical guidelines [50]) by a group of researchers in Germany to provide a tool for the quality assessment of printed or electronic health information in terms of their ability to be a decision aid for users/consumers [41]. The **Check-In** instrument is currently not validated or published, but can be accessed and downloaded online (via

http://www.patienten-information.de/patientenbeteiligung/check_in.pdf/view) [35].

IPDASi is a validated instrument developed in a comprehensive process by an international team of researchers, the International Patient Decision Aids Standards Collaboration (IPDAS), to assess the quality of patient decision aids and to support and help developers of decision aids to produce high-quality patient decision aids [51].

IPDASi is the most recently developed and validated tool for the quality assessment of patient decision aids. Decision aids are defined as “*interventions designed to help people make specific and deliberative choices among options by providing information about the options and outcomes that is relevant to a person’s health status*” [52]. The aim of this study was to assess the quality of patient information on CML and its treatment options in general and not specifically of decision aids.

For the above reasons, the quality of the included printed or online written consumer health information on CML and its treatment options will be assessed using the standardised quality appraisal instrument DISCERN [15].

IPDASi: validated instrument to assess the quality of patient decision aids

focus of this study is on the quality of patient information, thus DISCERN was chosen for quality assessment

2 Research Question and Aim

The aim of this study is to appraise the quality of written patient information materials about CML and its treatment options by using a standardised quality appraisal instrument and thereby identify areas for improvement. Further, the study will investigate whether there are differences in the quality of information materials provided by organisations that were actively seeking a quality certification for their organisation themselves compared to those which do not display a quality label on their website.

aim of the study:

**assessment of the
quality of written
patient information for
CML**

3 Methods

3.1 Identification of Materials: Search Strategy

To find written consumer health information materials about CML, we conducted an internet search in three search engines (www.google.com, www.yahoo.com, www.bing.com) [48]. We were looking for written consumer health materials about the treatment of CML including information on at least one of the three TKIs approved for CML therapy. Since not all patients and their relatives are familiar with sophisticated search mechanisms like Boolean operators [53] and since search engines do not have the capacity for complex searches as databases like Medline or Embase, we decided not to use the above instruments but rather search with single words to imitate the search behaviour of patients. Although we generally assume that patients would search with terms related to the indication (e.g. leukaemia, CML) we decided to use the names of the currently approved TKIs to ensure to get information about treatment options for CML rather than only about the disease in general. As already pointed out in the introduction, two new TKIs have been approved by the end of 2010. Thus, there are two additional orally administered and targeted drugs available for the treatment of CML patients which are considered to play an essential role in the treatment of CML. Therefore, we assume that the new drugs have already been included in existing patient information. As such, the search terms we used were the generic and brand names of these three drugs – imatinib, glivec[®], dasatinib, sprycel[®], nilotinib and tassigna[®]. The search within the three search engines was conducted between May 25, 2011 and June 04, 2011.

Studies show that 62% of search engine users click on a link displayed on the first page of the search results and 90% of search engine users consider only the search results of the first three pages [54, 55]. Nevertheless, we screened the first 100 hits for each search to make sure we did not miss any relevant information materials. As a first step, we copied the URL of websites containing information on CML and its treatment options in a spreadsheet with further information regarding date of publication or last update and name of the information provider. In a second step, we had a closer look at the gathered links to check whether they met our predefined inclusion criteria (see paragraph below) and included or excluded them for quality assessment. All in all, the search in three search engines with six different terms resulted in 1800 hits to be screened.

In addition, the marketing authorisation holders for the three TKIs, as well as national and European umbrella organisations of patient organisations and medical societies related to leukaemia were contacted directly and asked to send their patient information material related to the treatment of CML. Furthermore, between June 06, 2011 and June 28, 2011, we screened the websites of these 118 institutions for patient information materials meeting our inclusion criteria (Appendix, Table 10-1). Throughout the following pages, the first part of the search strategy will be referred to as internet search or websearch (WS) and the second part as handsearch (HS).

The study included written consumer health information available through internet websites or upon request by various institutions that:

internet search in three widely used search engines: Google, Yahoo and Bing

search terms included the generic and brand names of the currently approved TKIs for CML therapy

90% of search engine users consider the results of the first three pages; we screened the first 100 hits (10 pages)

hand search: directly contacting and searching the websites of organizations related to CML

inclusion criteria

- ❖ were specifically written for patients and lay audience,
- ❖ provide background information on CML,
- ❖ refer to different (at least one) therapy options for CML and
- ❖ were either in German or English.

exclusion criteria

Books, newspaper articles, scientific articles, package inserts/prescribing information, approval information, video tapes and discussion boards/forums were excluded.

3.2 Quality Assessment – DISCERN Instrument

DISCERN ...
...was the first instrument developed for the assessment of written patient information
... consists of 16 questions
... has a 5-point rating scale

DISCERN was the first instrument developed to help health consumers and information providers assess the quality of written information about different treatment choices for a health problem [15, 56]. The validated [57] rating tool is freely available in the internet and a handbook describing the use of DISCERN is provided at www.discern.org.uk. DISCERN consists of 16 questions divided into three different sections: section 1 (questions 1-8) focuses on the reliability of the patient information material and section 2 (questions 9-15) evaluates the quality of the information of the different treatment options described. The third section (question 16) asks for an overall quality rating of the source as a whole and its potential to be an appropriate source of information for supporting decision making about the treatment options for the patient after having rated the first 15 questions [58]. Each DISCERN item was rated based on a 5-point rating scale ranging from definitively no (rating: 1) to definitively yes (rating: 5) according to the description in the DISCERN handbook [49, 58]. The intervals between the ratings are assumed to be of the same interval / evenly distributed. The DISCERN rating was conducted by two independent assessors. Disagreement was resolved by discussion. For statistical analysis and comparison of the included materials either the absolute DISCERN rating (minimum 15 to maximum 75) or the means of the DISCERN rating, later on referred to as DISCERN score, of section 1 and 2 (questions 1 to 15; minimum 1 to maximum 5) were used. For further description of the quality of the included materials, the DISCERN rating was divided into five categories: excellent (63-75), good (51-62), fair (39-50), poor (27-38) and very poor (15-26) [57].

additional information to the DISCERN questions extracted

In addition to the DISCERN questions, we extracted further descriptive data related to the information provider (e.g. type of organisation, funding of organisation, availability of quality labels such as “Health on the Net” (HON) or AFGIS (www.hon.ch, www.afgis.de) [5]) and type and publication date of the information material for further characterization of the included materials. The study protocol was approved by the Research Committee for Scientific and Ethical Questions (RCSEQ) at UMIT – University for Health Sciences, Medical Informatics and Technology and at fhg – Fachhochschule Gesundheit GmbH [59].

study protocol approved by RCSEQ

3.3 Statistical Analysis

The final number of included materials was not known a priori. Hence, no a-priori hypotheses were generated. Thus, this study is primarily exploratory and aims to generate hypotheses to be investigated in further and more extensive studies. Although the 5-point rating-scale is not an interval scale per definition, we assumed that the intervals between the 5 points were equal. Therefore, we calculate means and standard deviations (SD) for the descriptive analyses based on the DISCERN ratings. To quantify the variation of standard deviation, the coefficient of variation was computed. A mean DISCERN score (minimum 1 to maximum 5) was calculated by averaging the ratings of question 1 to 15 (DISCERN sections 1 and 2) to compare the ratings of the materials by their specific characteristics. The distribution of the data was examined using the histogram (Appendix, Figure 10-1). As normal distribution of the data was not shown and the number of included materials was small, non-parametric tests were performed for comparison. Depending on the amount of groups for comparison, either the Mann-Whitney U test or the Kruskal-Wallis test [60] was used to compare the mean DISCERN scores based on the following categories: information providers, availability of quality labels and the amount of quality labels available, primary source of funding, language and publication date of the included materials. For graphical illustration of the results we used a point diagram, a pie chart and a histogram. Results of the statistical tests were considered significant at $p < 0.05$. The analyses were conducted using SPSS version 18.

no hypotheses were generated a priori
study is primarily exploratory

Mann-Whitney U test or Kruskal-Wallis test were used to compare mean DISCERN scores and ratings

4 Results

4.1 Selection of Written Consumer Health Information for Quality Assessment

After the initial websearch, 516 links referring to CML and to at least one treatment option for CML were included to be examined in detail. The exact list of URLs including source of information search and reason for exclusion can be obtained from the authors. Of these 516 hits, 15 fulfilled the inclusion criteria and were included for quality assessment.

websearch: 15 materials included

Of the 118 institutions we contacted (Appendix, Table 10-1), 18 (15.3%) responded to our request for information. The organisations that responded to our e-mail asking for written consumer health information were charities, patient organisations and scientific groups. These organisations responded within a time period of 1 to 10 days. Eight materials of these 18 institutions were included for quality assessment, the remaining 10 were excluded because they did not provide patient information at all or on CML (n=8) or the language was other than English or German (n=2; Dutch, Serbian). Upon searching the websites of these institutions, 24 patient information materials were identified; 7 of those were duplicates of the materials sent to us upon our e-mail request. Thus, 25 references of 20 different institutions were included based on the second part of the search strategy. 8 of the 25 hits of this handsearch were duplicates of materials already obtained by the websearch.

18 of the 118 institutions we contacted responded to our request

hand search: 25 references of 20 institutions included

8 duplicates with websearch

Combining these two search strategies, 33 patient information materials by 29 different organisations were included for quality assessment. Some of these institutions provided more than one information material for patients (e.g. leaflet and brochure or brochure and website). The flow-chart illustrating the search and reasons for exclusion is depicted in detail in Figure 4-1.

33 materials were included overall

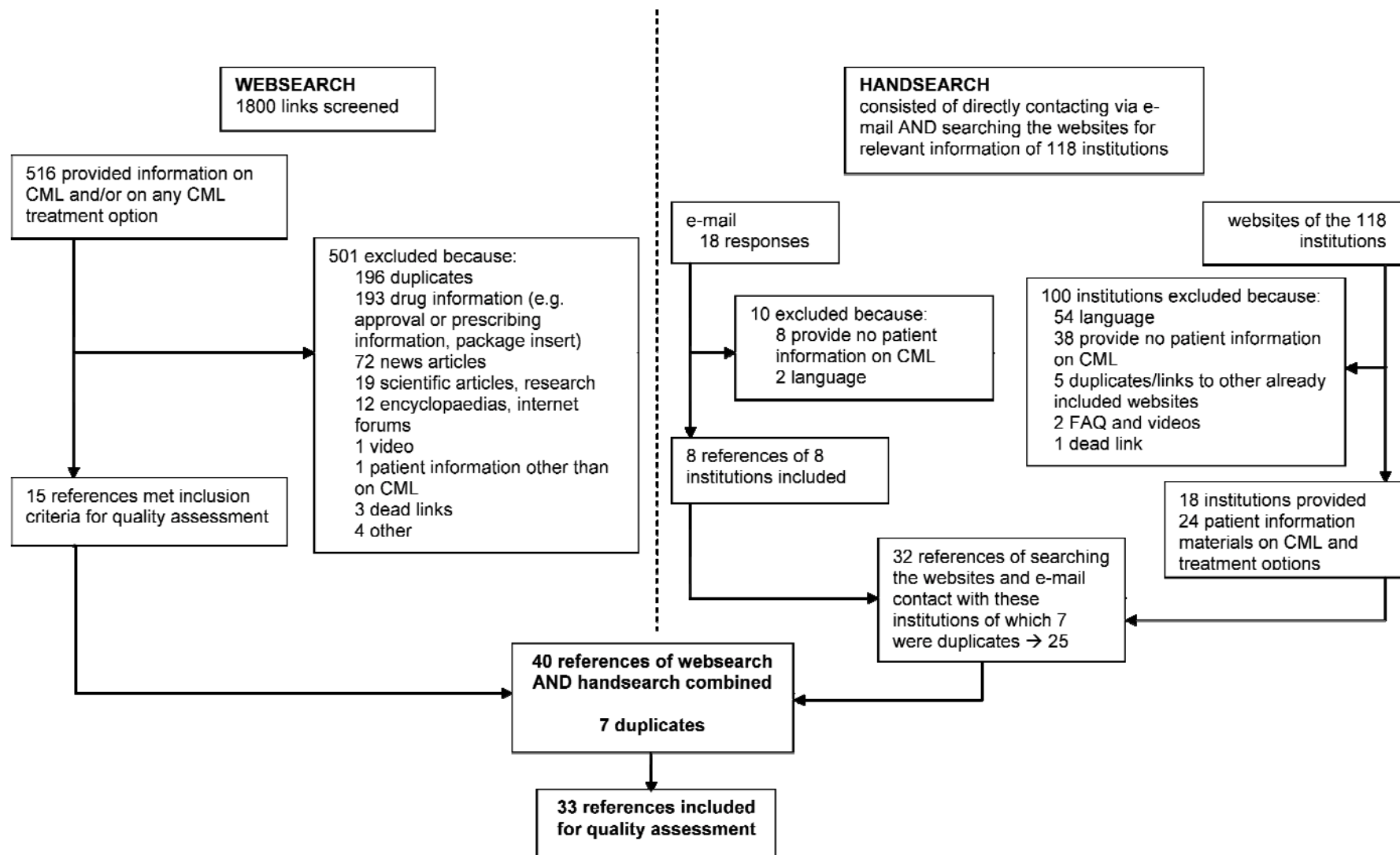


Figure 4-1: Selection process of written CHI materials on CML for the quality assessment with the standardized instrument DISCERN

4.2 Overall Characteristics of Included Information Materials

The list of the 33 included patient information materials on CML and its treatment options is available in Table 4-1. The identification number of the included materials provided in the first column of Table 4-1 will be used for identifying the materials within tables and figures. 22 materials were written in English and 11 materials were in German. The materials were either hard-copy brochures (n=4) directly sent to us via mail by the referring provider, PDFs (n=7) downloaded from the websites of providers or by following the link sent to us via e-mail by providers or (sub-)websites (n=22) of information providers. Some of the PDFs are actually printed information brochures for patients, but the organisations could not send them to us via mail, as they are either not allowed to send information material outside their country of residence due to individual institutional guidelines or because they sent the wrong brochure or the organisations did not respond to our e-mail asking to provide hard copies of their brochures at all.

All included materials were published or updated between 2006 and 2011. In the case of 9 materials, we could not find information about the publication date, 8 were published between 2006 and 2009 and the remaining 16 references were published 2010 or 2011.

**description of the
information materials:**

- 4 brochures
- 7 PDF-files
- 22 websites

**materials were
published between 2006
and 2011**

Table 4-1: Included patient information materials in alphabetical order of the information providers

ID	Title of the Information Material	Publication Date	Type of Information material	Language	Information Provider / Name of Organisation	Weblink
HS_E_1	Leukemia -- Chronic Myeloid (Myelogenous)	2011	PDF	English	American Cancer Society	http://www.cancer.org/acs/groups/cid/documents/webcontent/003112-pdf.pdf
WS_B_2	Chronische Myeloische Leukämie	2011	Website	German	Apotheken-Umschau; Medikamentencheck Arzneimittelinformationen	http://www.apotheken-umschau.de/leukaemie/cml
WS_G_3	What is chronic myeloid leukemia (CML)?	2011	Website	English	Bristol Mayer Squibb	http://www.sprycel.com
WS_G_4	Chronic myeloid leukaemia (CML)	2010	Website	English	Cancer Research UK	http://cancerhelp.cancerresearchuk.org/type/cml
HS_W_5	Leukemia - Chronic Myeloid – CML	2010	Website	English	Cancer.Net	http://www.cancer.net/patient/Cancer+Types/Leukemia+-+Chronic+Myeloid+-+CML
HS_W_6	Leben mit chronisch myeloischer Leukämie (CML)	NA	PDF (w)	German	Central European Leukemia Study Group (CELSG)	http://www.cml-info.com/fileadmin/pictures/Downloads/CML_Brosch%FCre.pdf
HS_W_7	Die chronische myeloische Leukämie im Überblick	NA	Website (PDF)	German	Central European Leukemia Study Group (CELSG)	http://www.cml-info.com/de/patienten-und-betroffene/die-cml-im-ueberblick.html
HS_W_8	Novartis Oncology - Information on Chronic Myeloid Leukemia (CML)	2007	Website	English	CML Alliance	http://www.novartis oncology.com/patients-caregivers/what-is-cancer/chronic-myeloid-leukemia.jsp
HS_W_9	Leukämie bei Erwachsenen. Die blauen Ratgeber. Antworten. Hilfen. Perspektiven	2011	Brochure	German	Deutsche Krebshilfe e.V.	http://www.krebshilfe.de/fileadmin/Inhalte/Downloads/PDFs/Blaue_Ratgeber/020_leukaemie.pdf
WS_B_10	Chronische Myeloische Leukämie - Ratgeber für Patienten	2010	Brochure	German	Deutsche Leukämie- & Lymphomhilfe e.V. (DLH)	http://www.leukaemie-hilfe.de/broschueren.html?&no_cache=1&tx_drblob_pi1[downloadUid]=78
HS_W_11	Krebsarten: Leukämien und Lymphome – Leukämie	2011	Website	German	Deutsche Krebsgesellschaft (DKG)	http://www.krebsgesellschaft.de/pat_ka_leukaemie_therapie_chronische,107827.html
HS_E_12	Chronic Myeloid Leukaemia (CML)	2011	Website	English	Irish Cancer Society - The national charity for cancer care	http://www.cancer.ie/cancerInfo/cml_cancer_information.php
HS_W_13	Informationen für Patienten	2008	Website	German	Kompetenznetz Leukämien	http://www.kompetenznetz-leukaemie.de/content/patienten
HS_E_14	Leukämie bei Erwachsenen. Eine Information der Krebsliga für Betroffene und Angehörige	2008	PDF	German	Krebsliga Schweiz	http://assets.krebsliga.ch/downloads/1025.pdf

ID	Title of the Information Material	Publication Date	Type of Information material	Language	Information Provider / Name of Organisation	Weblink
HS_W_15	Chronic Myeloid Leukaemia (CML)	2010	PDF (w + PDF)	English	Leukaemia & Lymphoma Research	http://www.beatbloodcancers.org/sites/default/files/CML%20booklet_o.pdf
HS_W_16	Chronic Myeloid Leukaemia (CML)	NA	PDF (w + PDF)	English	Leukaemia & Lymphoma Research	http://www.beatbloodcancers.org/sites/default/files/CML%20leaflet_o.pdf
HS_W_17	Chronic myeloid leukaemia (CML)	2011	Website (2 PDF)	English	Leukaemia & Lymphoma Research	http://leukaemialymphomaresearch.org.uk/patient-information/chronic-myeloid-leukaemia-cml
HS_W_18	Chronic Myelogenous Leukemia	NA	PDF (w)	English	Leukemia & Lymphoma Society - fighting blood cancers	http://www.lls.org/content/nationalcontent/resourcecenter/freeducationmaterials/leukemia/pdf/cml.pdf
HS_W_19	Leukemia - Chronic Myeloid Leukemia	2011	Website (PDF)	English	Leukemia & Lymphoma Society - fighting blood cancers	http://www.lls.org/#/diseaseinformation/leukemia/chronicmyeloidleukemia
WS_B_20	Das Special: CML	2008	Website	German	Lifeline - Gesundheitsportal von Springer Medizin; BSMO GmbH	http://www.lifeline.de/cda/krankheiten_az/krankheitenlexikon/content-137653.html#C
WS_G_21	Chronic Myeloid Leukaemia	2011	Website	English	Macmillan	http://www.macmillan.org.uk/Cancerinformation/Cancertypes/Leukaemiachronicmyeloid/CML.aspx
HS_W_22	Chronic Myelogenous Leukemia	2010	Website	English	Mayo Clinic	http://www.mayoclinic.com/health/chronic-myelogenous-leukemia/DS00564
WS_G_23	My CMLCircle® - Building around you. About CML	NA	Website	English	MyCMLCircle® - Novartis Oncology	http://www.mycmlcircle.com/patient/tasignafacts.jsp?usertrack.filter_applied=true&NovaId=2935376878981282949
WS_G_24	What You Need to Know About™ Leukemia	2008	Brochure	English	National Cancer Institute	http://www.cancer.gov/cancertopics/wyntk/eukemia.pdf
HS_W_25	Living with CML	2010	Website	English	National CML Society	http://nationalcmlsociety.org/how-use-our-site
WS_G_26	Chronic Myelogenous Leukemia (CML), Imatinib (Gleevec®) and Transplant	NA	Website	English	National Marrow Donor Program (NMDP)	http://www.marrow.org/PATIENT/Undrstnd_Disease_Treat/Lrn_about_Disease/CML/index.html
WS_G_27	Nilotinib Information	NA	Website	English	Nilotinib.org	http://www.nilotinib.org

ID	Title of the Information Material	Publication Date	Type of Information material	Language	Information Provider / Name of Organisation	Weblink
WS_G_28	CML - Chronische Myeloische Leukämie	NA	Website	German	Novartis Pharma Schweiz	http://www.cml-info.ch/page/content/index.asp?MenuID=5318&ID=9649&Menu=51&Item=18
WS_G_29	Chronic Myeloid Leukaemia	2006	Website	English	Patient.co.uk	http://www.patient.co.uk/health/Leukaemia-Chronic-Myeloid.htm
WS_Y_30	Leukemia - Health Pages	2008	Website	English	Revolution health	http://www.revolutionhealth.com/conditions/cancer/leukemia/index
HS_E_31	CML - Chronische Myeloische Leukämie. Ein Ratgeber für Patienten und Angehörige	NA	Brochure	German	Stiftung zur Förderung der Knochenmarktransplantation (SFK)	www.knochenmark.ch
WS_G_32	Imatinib for chronic myeloid leukaemia. Understanding NICE guidance - information for people with CML, their families and carers, and the public	2011	PDF	English	UK NICE	http://www.nice.org.uk/nicemedia/live/11516/32755/32755.pdf
WS_G_33	Chronic myelogenous leukemia	2006	Website	English	Wrongdiagnosis.com	http://www.wrongdiagnosis.com/c/chronic_myelogenous_leukemia/intro.htm

Abbreviations: NA – not available; ID – identification number of the material: is a combination of source of search (WS – websearch or HS – handsearch) and a consecutive number from 1-33 of the materials in alphabetical order of the information provider: WS_G/Y/B – websearch in Google/Yahoo/Bing; HS_E/W – handsearch + material retrieved either via e-mail or website.

18 of the 33 materials were from information providers that displayed the logo of a quality certification on their website. The amount of quality labels at the websites of information providers ranged from 0 to 4. 8 websites had 1 quality label, 6 websites had 2, 3 had 3 and 1 had 4 different quality labels. All in all, 14 different quality labels were identified. These quality labels are depicted in Table 4-2 and a brief piece of information about the organisations managing these certificates including their aims is provided.

Providers of the patient information materials were charities (n=8), scientific groups (n=5), public institutions (n=2), pharmaceutical industry (n=4), patient organisations (n=4), health organisations (n=4), other commercial organisations (n=5) and others (n=1).









Primary source of funding of these information providers is a mix of funding (n=13), industry (n=9), public funding (n=2), donations from individuals (n=4) and for 5 information providers, no information regarding funding was accessible via the internet. For the purpose of analysing the differences in means, the above-mentioned providers of health information were grouped into three different categories (non-profit organisations, commercial organisations and others) due to the small number of included materials per information provider.







18 materials were from information providers that had a quality certification

providers of information materials

primary source of funding of the providers: mix of funding, industry, public funding and donations from individuals

Table 4-2: Overview of quality labels displayed on the websites of the information providers of the included materials

Quality Label	Name of the Organisation	Logo / Label	Aim of the Organisation and Quality Certification	Weblink
AFGIS	Aktionsforum Gesundheitsinformationssystem e.V.		Promotes the quality of health information.	http://www.afgis.de
AMRC	Association of Medical Research Charities		Aims to support the medical research sector's effectiveness and advanced medical research by developing best practice, providing information and guidance, improving public dialogue about research and science, and influencing government.	http://www.amrc.org.uk/home
Charity Navigator	Charity Navigator – Your Guide To Intelligent Giving		The goal is to help people to donate to charities with confidence and to aim to help charities by shining lights on truly effective organizations.	http://www.charitynavigator.org
FRSB	Fund Raising Standards Board		Oversees a transparent and independent regulatory scheme for fundraising, aiming to raise standards and build public confidence in fundraising.	http://www.frsb.org.uk
GuideStar® Member	Guide Star		GuideStar encourages non-profit organisations to share information about their organisation openly and completely.	http://www2.guidestar.org
HON	Health on the Net Foundation		Promotes and guides the development of useful and reliable online health information, and its appropriate and efficient use.	http://www.hon.ch
MediSuch	MediSuch. Die Spezial-Suchmaschine für Medizin und Gesundheit		MediSuch is a search engine in the field of medicine and health that searches within a positive list of information providers who are independent from the related industry.	http://www.medisuch.de
SHQA	Swiss Health Quality Association		Aims to promote the quality of information and communication in the health care sector.	http://www.shqa.ch/index.cfm

Quality Label	Name of the Organisation	Logo / Label	Aim of the Organisation and Quality Certification	Weblink
Standards of Excellence®	Standards of Excellence Certification Program of the National Health Council		Is a set of good operating practices to ensure that the voluntary health agency members of the National Health Council maintain the highest standards of organizational effectiveness and public stewardship.	http://www.nationalhealthcouncil.org/pages/standards.php
Stiftung Gesundheit – Zertifizierte Website	Stiftung Gesundheit		The aim of Stiftung Gesundheit is to foster transparency and to offer practical guidance within the health care sector.	http://www.stiftung-gesundheit.de
The Crystal Mark Standard	Plain English Campaign – Fighting for crystal-clear communication since 1979		Aims to assess the clarity of documents – it is given if publicly available information is provided as clear as possible.	http://www.plainenglish.co.uk/crystal-mark/about-the-crystal-mark/the-crystal-mark-standard.html
The Information Standard	The Information Standard developed by the Department of Health, UK		Aims to help the public identify trustworthy health and social care information easily.	http://www.theinformationstandard.org
VKI-Konsument.at	Verein für Konsumenteninformation (VKI) (registered association for consumer information)		VKI advocates the interests of the Austrian consumers, informs them about and supports them in enforcing their rights.	http://www.konsumnet.at/cs/Satellite?pagename=Konsument/MagazinArtikel/Detail&cid=318870962529
ZEWÖ	Schweizerische Zertifizierungsstelle für gemeinnützige, Spendensammelnde Organisationen		Takes a stand for the promotion of transparency and integrity in the field of donations and audits non-profit organisations in terms of faithful handling of the received donations.	http://www.zewo.ch

4.3 Overall DISCERN Results

**mean DISCERN rating:
44.12 (range 24 to 65)**

**mean DISCERN score:
2.94 (range 1.6 to 4.33)**

The overall mean DISCERN rating of a maximum rating of 75 points based on the questions 1 to 15 is 44.12 (range 24 to 65; SD 11.49) across all included information materials. The overall mean DISCERN score is 2.94 (range 1.6 to 4.33; SD 0.766) out of a maximum score of 5 across all included materials. The mean score, range and SD for each DISCERN question are shown in Table 4-3, ranging from 1.64 (SD 1.14; description of what would happen if no treatment is used) to 4.36 (SD 0.93; make clear that more than one treatment option is available).

Table 4-3: Combined results of the sixteen DISCERN questions based on all 33 information materials

DISCERN Question	Mean Score	SD	CV	Minimum Score	Maximum Score
1. Is the publication reliable?	3.39	1.41	0.42	1	5
2. Does it achieve its aims?	3.85	1.30	0.34	1	5
3. Is it relevant?	3.91	1.16	0.30	2	5
4. Is it clear what sources of information were used to compile the publication (other than the author or producer)?	2.15	1.46	0.68	1	5
5. Is it clear when the information used or reported in the publication was produced?	2.03	1.72	0.85	1	5
6. Is it balanced and unbiased?	3.48	1.23	0.35	1	5
7. Does it provide details of additional sources of support and information?	3.09	1.51	0.49	1	5
8. Does it refer to areas of uncertainty?	2.00	0.75	0.38	1	4
9. Does it describe how each treatment works?	3.12	1.47	0.47	1	5
10. Does it describe the benefits of each treatment?	2.97	1.08	0.36	1	5
11. Does it describe the risks of each treatment?	2.91	1.26	0.43	1	5
12. Does it describe what would happen if no treatment is used?	1.64	1.41	0.86	1	5
13. Does it describe how the treatment choices affect overall quality of life?	2.45	0.87	0.36	1	4
14. Is it clear that there may be more than one possible treatment choice?	4.36	0.93	0.21	1	5
15. Does it provide support for shared decision-making?	2.76	1.17	0.42	1	5
16. Overall rating of the quality of the publication as a source of information about treatment choices on the previous answers	2.70	0.85	0.31	1	4

Abbreviations: SD – standard deviation; CV – coefficient of variation

Taking the coefficient of variation into account, question 5 “Is it clear when the information used or reported in the publication was produced?” and question 12 “Does it describe what would happen if no treatment is used?” demonstrate a high variation of the DISCERN rating, 0.85 and 0.86, respectively. On the other hand, question 14 “Is it clear that there may be more than one possible treatment choice?” shows a rather small variation with a coefficient of variation of 0.21.

DISCERN question 16 asks for an overall rating of the relevance of the publication as a source of information about treatment choices. As shown in Figure 4-2, none of the included materials was considered to be a complete, accurate and comprehensive source of information about treatment choices or an aid for decision making. Three were regarded as being definitely no appropriate materials for information and the majority of included materials are considered to be partly appropriate.

the majority of included materials were considered partly relevant as a source of information about treatment choices

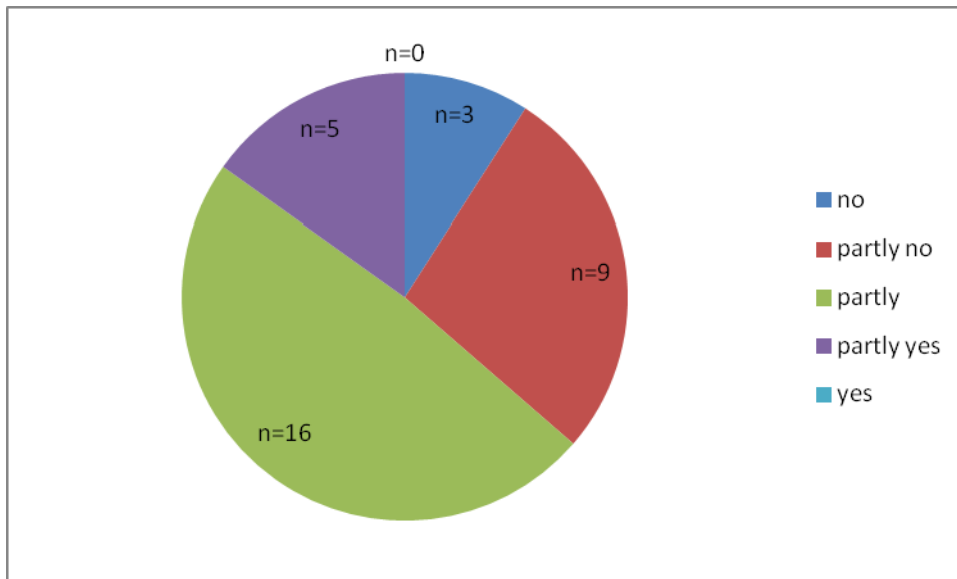


Figure 4-2: Overall rating (DISCERN question 16) of the information material as a source for information about treatment options

Table 4-4 gives an overview of the DISCERN ratings represented as the five predefined categories (excellent, good, fair, poor and very poor) of the included materials depicted according to the information providers. 2 materials are rated as excellent information materials, 7 and 12 were considered to be good and fair, respectively, and 12 materials were rated as poor or very poor information materials.

2 and 12 materials were considered being excellent and poor or very poor, respectively

Table 4-4: Information materials according to categories of DISCERN ratings and information provider

	Charity (n=8)	Scientific Group (n=5)	Public Institu- tion (n=2)	Pharma In- dustry (n=4)	Patient Org. (n=4)	Health Org. (n=4)	Other Com- mercial Org. (n=5)	Others (n=1)
Excellent (63-75)	1	-	-	-	1	-	-	-
Good (51-62)	2	3	1	-	1	-	-	-
Fair (39-50)	2	2	-	1	1	4	2	-
Poor (27-38)	2	-	1	3	1	-	3	1
Very poor (15-26)	1	-	-	-	-	-	-	-

Abbreviation: Org - Organisation

4.4 DISCERN Score According to Characteristics of Information Materials

characteristics of materials that might impact the quality of patient information materials

In order to find parameters that might influence or have an impact on the quality of written consumer health information, we performed analyses considering the different characteristics of the included patient information materials or the corresponding provider.

Figure 4-3 illustrates the heterogeneity of the included materials in terms of DISCERN rating of each included information material according to the categories non-profit organisations, commercial organisation or others related to the provider of the information material.

statistically significant difference in mean DISCERN score

The means of DISCERN ratings showed a statistically significant discrepancy between these 3 types of information providers ($p=0.012$) with non-profit organisations having the highest values and commercial organisations having the lowest values. The mean scores range from 3.22 (SD 0.725; non-profit organisation) to 2.84 (SD 0.65; others). The same was observed when comparing the ratings of German-language and English-language materials, with a higher mean DISCERN score for English-language information material ($p=0.031$) (Table 4-5).

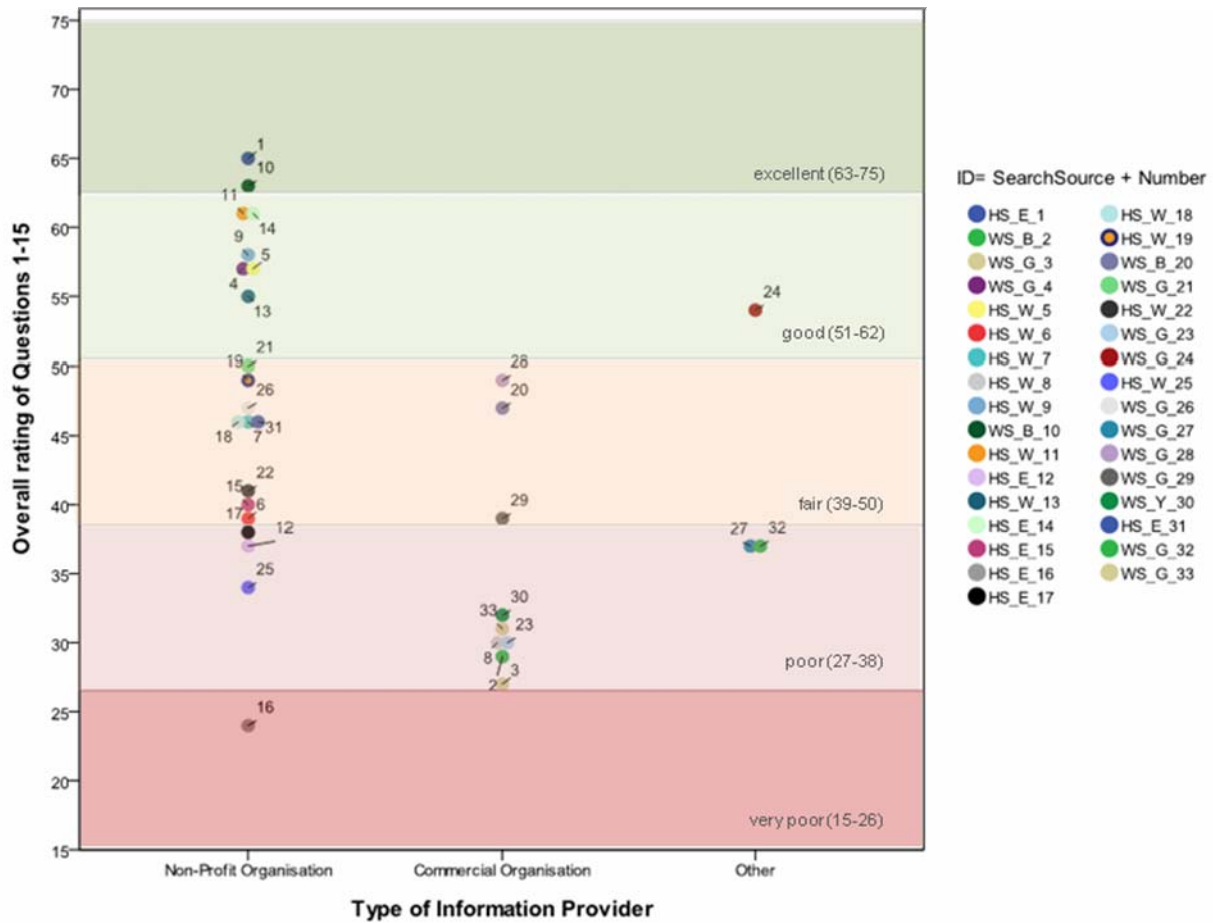


Figure 4-3: DISCERN rating (min 15 to max 75) based on questions 1 to 15 according to type of information provider

The comparison by the primary source of funding of the information provider was statistically significant ($p=0.020$). Those organisations that were primarily financed by a mix of funding had the highest DISCERN score compared to those solely financed by industry or those who did not provide information about their funding at all.

In contrast, the comparison of information providers that were approved by a quality seal and the amount of quality labels available did not show any statistically significant differences. The same is true for the comparison by type of information material (brochure, PDF or website) and publication date of the material.

difference in quality rating according to primary source of funding

mean DISCERN score did not differ statistically significant between providers that had a quality certification

Table 4-5: Comparison of the mean DISCERN score by characteristics of the information materials

Characteristics (n)	Mean DISCERN score	SD	Mean DISCERN rating of max 75	SD	p value*
Overall (33)	2.94	0.77	44.12	11.49	
<i>Type of Information Provider</i>					
Non-Profit Organisations (21)	3.22	0.73	48.29	10.88	0.012
Commercial Organisations (9)	2.33	0.54	34.89	8.15	
Others (3)	2.84	0.65	42.67	9.82	
<i>Primary Source of Funding</i>					
Mix of Funding (13)	3.44	0.65	51.62	9.69	0.020
Industry/Commercial (9)	2.33	0.54	34.89	8.15	
Public Funding (2)	3.03	0.80	45.50	12.02	
Donations of Individuals (4)	2.65	0.90	39.75	13.53	
Not available (5)	2.95	0.58	44.20	8.64	
<i>Quality Label available</i>					
Yes (18)	3.03	0.77	45.50	11.55	0.385
No (15)	2.83	0.77	42.47	11.61	
<i>Number of Quality Labels</i>					
1 label (8)	2.56	0.52	38.38	7.84	0.055 [#]
2 labels (6)	3.68	0.63	55.17	9.52	
3 labels (3)	2.76	0.72	41.33	10.79	
4 labels (1)	3.8	-	57	-	
None (15)	2.83	0.77	42.47	11.61	
<i>Type of Information Material</i>					
Brochure (4)	3.68	0.48	55.25	7.18	0.123
PDF (7)	2.97	0.95	44.57	14.27	
Website (22)	2.78	0.69	41.95	10.35	
<i>Language</i>					
German (11)	3.36	0.69	50.36	10.5	0.031
English (22)	2.73	0.73	41.00	10.87	
<i>Publication Date</i>					
2006-2009 (8)	2.91	0.82	43.63	12.26	0.476
2010 or 2011 (16)	3.10	0.84	46.44	12.55	
Not available (9)	2.70	0.58	40.44	8.68	

*Mann-Whitney U test for comparison of difference of mean DISCERN score of two groups; Kruskal-Wallis test for comparison of difference of mean DISCERN score of more than two groups; [#]as only one information provider displayed 4 different quality labels and therefore the mean could not be calculated, this information material was excluded from the comparison.

5 Discussion

The major findings of this study confirm that there is a wide variety of information available and easily accessible on the internet [37], but that only the minority of this information effectively meets the criteria for high-quality patient information materials.

In general, the quality of the included information materials is fair with a mean DISCERN rating of 44.12 (range 24 to 65). If one takes a closer look at each single DISCERN question, it becomes clear that the majority of the included materials does neither explicitly nor implicitly state the option of refusing treatment or refers to the decision of no treatment at all (mean DISCERN score: 1.64). On the other hand, the fact that there is more than one treatment option available to treat CML (mean DISCERN score: 4.36) is addressed more often and more explicitly. Given the statement that there are more than one potential treatment options, one would assume that the benefits and risks of each treatment option would be addressed to an equal extent. Although results regarding these two questions (DISCERN questions 10 and 11) do not confirm this assumption, as their mean DISCERN score is around 3 (=partly). When assessing the information materials, it was noted that various treatment options were listed, but that a range of the materials does not describe benefits and harms of all options mentioned in the same detail but rather focuses on one specific treatment option. Thus, the information included cannot be regarded as balanced in terms of content provided overall. Question 6 on the other hand aims to determine whether the information material is balanced and unbiased, which is rated above average (mean DISCERN score: 3.46), although this question refers to the structural quality of the information material, not the content presented. In 2002, Eysenbach et al. published a systematic review on the quality of health information on the internet and found that most of the studies published until then criticised the difficulty of finding high-quality websites and lack of completeness and accuracy of the content presented on the websites [61]. Our findings support these conclusions.

Evidence suggests that the origin of the information (information provider) is generally not associated with the quality of the information material provided. For instance, one would expect that information provided by university institutions is of higher quality than information produced by organisations having a potential conflict of interest [62]. Due to the small number of included information materials, an analysis of the quality rating by information provider was not feasible. Therefore, we grouped the information providers into three different categories – non-profit organisations, commercial organisations or others – showing significantly higher DISCERN ratings of information provided by non-profit organisations compared to that provided by commercial organisations (difference in mean DISCERN score: 0.89; $p=0.012$). Although there is a difference in quality rating regarding the type of information provider in our analysis, this might not be generalizable due to the small number of included information materials and further due to the different size of the groups compared. On the other hand, a study investigating written information provided and distributed by office-based general practitioners in Berlin, Germany, found that the majority (>90%) of materials was produced by the pharmaceutical industry and that, information provided may be accurate but it may, at the same time, be influencing due to incomplete and unbalanced information [2]. Another astonishing

wide variety of information materials of different quality available

overall, materials were of fair quality

option of refusing treatment is generally not addressed

despite making clear that more than one treatment option is available the benefits and risks for each option are not described in a balanced manner

origin of the information generally not associated with the quality of the information material

difference in quality rating between commercial and non-profit organisations

majority of information materials provided by commercial providers

though information is accurate, it might be misleading at the same time

finding was that the quality of information materials offered by providers with quality certified websites did not differ from those that did not display a logo of quality certification on their website ($p=0.385$) or that the amount of quality labels displayed did not play a statistically significant role ($p=0.055$).

finding accurate, comprehensive and relevant information can be challenging for a lay audience

not only the existence or availability but also the access to high-quality information is essential in SDM

guidelines to lead the lay audience through the jungle of health information were developed

one approach is to depend on quality labels

quality certifications aim to set apart trustworthy from non-trustworthy websites

criteria of quality labels mainly refer to transparency criteria and do not assess the accuracy and content quality of the information provided

for the assessment of the quality of content other instruments are suggested (e.g. DISCERN)

To find materials or websites that provide comprehensive information about both, the disease itself and a complete description (mechanism of action, benefits and risks) of available treatment options, is challenging for a lay audience. Further, finding information sources that give information on the disease and its treatment options does not necessarily mean that this information is accurate, relevant and comprehensive. For example, when we looked at the 516 links gathered during the first screening of the websearch, it turned out that only 15 (~3%) met our inclusion criteria. This would not have been surprising had the inclusion criteria been too narrow, but we already included information materials referring to at least one treatment option and not all currently available treatment options as depicted in the NCCN and ELN guidelines. This finding shows that not only the existence or availability but also the access to high-quality patient information is an essential part in SDM and health literacy. To address this need, several initiatives developed manuals for patients and health consumers intended to guide them through the jungle of health information available in the internet. The recommendations in these manuals range from suggestions on how and where to search and choosing the right search terms to the statement of particularly trustworthy websites and an overview of trustworthy quality certifications (e.g. HON, AFGIS, etc.) [48]. On the other hand, there are initiatives supporting the implementation of independent high-quality, up-to-date patient information and services (e.g.

www.gesundheitsinformationen.de, MediSuch, www.patienten-information.de) and medical and health care societies also develop and provide freely accessible treatment guidelines for patients (e.g. www.nccn.org/patients or www.uptodate.com/patients).

To get an idea whether a website is trustworthy or not, one rather easy approach for patients and health consumers is to rely on the presence or absence of a quality seal on the website of an information provider. As good as this seems to be and the original intention was, one has to be careful when relying on the quality of the presented information only because the provider is approved by a quality label due to several reasons. First, the majority of the criteria relevant to get a quality label refers to transparency and funding of the information provider, but does not refer to the accuracy and quality in terms of being comprehensive and balanced of the content at all. Those third party organisations providing such quality labels explicitly state that they do not rate the accuracy and balanced presentation of the content provided but that due to the commitment to transparency criteria by the information provider it is assumed that this also leads do more transparent, objective and qualitative information [63]. For the assessment of the content of the quality they refer to other rating instruments including DISCERN [63], which, itself does explicitly not assess the scientific quality and accuracy of written consumer health information [58].

Second, not all quality labels are awarded by independent third-party organisations. The Swiss Health Quality Association (SHQA), for example, is a registered association of pharmaceutical companies that aims to promote quality of communication and information in the health care setting. Although the aim of SHQA is noteworthy, there is still a non-neglectable potential for conflict of interest.

Third, a study investigating the ability of a quality seal like HON to be an indicator of general and content quality of a health-related website was published recently. Results of that study show that the HON label is not able to discern the reliability and accuracy of the content provided by an approved provider [62], which supports the criticism on rating instruments for medical websites by Eysenbach and Diepgen in 1998 [37]. They claim that these instruments are of questionable validity and reliability. Our findings reconfirm this criticism and lead at the same time to the question whether DISCERN is the most appropriate instrument to assess the quality of written consumer health information on different treatment options which remains open after this assessment. This might be due to the fact that internet information is changing too rapidly and dynamically to assure a good quality of the content of information and that these ratings are generally conducted by third parties, e.g. expert scientists who might not be aware of the patients' needs and preferences [37].

Based on these findings it is recommended to prefer and rely on health information materials provided by non-commercial organisations rather than commercial organisations. Further, one should be aware of the fact that quality labels like HON, AFGIS or SHQA certify only transparency criteria of a website and not the content. Thus, in order to discriminate between low and high quality of written consumer health information health consumers as well as health professionals should use validated rating instruments like DISCERN when searching for or recommending written health information.

before relying on a quality label inform yourself about the criteria underlying the certification

quality certifications / labels are not able to discern the reliability and accuracy of the content

question remains whether the quality of patient information can be assessed reliably with existing instruments within this rapidly and dynamically changing environment

6 Conclusion

Information provided in the internet is widely unbalanced and incomplete and bears a substantial potential for conflict of interest. Major concerns are that information is often retrieved without the correct context (e.g. patients read information originally intended for physicians and/or do not read the preceding introduction to the information or even guideline and misinterpret the provided information) and that incorrect information can do more harm than good to the patient. As health information in the internet cannot be regulated as a whole, emphasis has to be put on helping patients to cope with the variety of information available and guide them through the jungle of information in order to enable them to access independent, accurate and reliable health information [37, 48]. Particular areas for improvement of the included patient information materials is, on the one hand, the comprehensive provision of information about when, how and by whom the information was produced and which literature was used. On the other hand, the description of benefits and harms of each stated treatment option should be presented in a balanced way in order to enable patients to be well-informed and to participate actively in their treatment management process.

information in the internet is widely unbalanced and incomplete

incorrect information might do more harm than good to the patients

particular areas of improvement are transparency and balanced presentation of the information

7 Limitations

Our study has several limitations. First of all, we only included consumer health information in English and German and thus, results cannot be generalized within the European context. Second, in the course of our websearch and handsearch, we might have missed relevant written patient information developed and distributed to the patients directly by physicians or other health care professionals.

Further, the amount of finally included materials is too small to draw firm conclusions and the study looks at patient information about CML and its treatment options only, which is why conclusions cannot be drawn for patient information materials on leukaemia or in the general health care setting at all.

Another limitation might be that we conducted our websearch in widely used search engines, which are assumed to be more commonly used by the general population, rather than in medical search engines that might have focused more specifically on health-related issues. Internet users would probably combine search terms or would search by using other terms (e.g. rather disease-related terms than treatment-related terms) and would thus get different results. Further, we did not include a patient in the design of the search strategy or in conducting the search, selection of the relevant materials and quality appraisal of the included materials. We, therefore, are not able to judge how patients behave when selecting information from the web. However, as an additional handsearch including direct inquiries of relevant organisations was conducted, we assume to have gathered most of the written health information on CML and its treatment options available that is freely accessible for health consumers through the internet.

We used DISCERN for the quality appraisal of the included materials as it currently is the only standardized and validated instrument to assess the quality of written consumer health information on different treatment options. One substantial deficit of DISCERN is that it does not take the accuracy of the presented content into account.

limitations:

- language
- identification of materials not available through the internet
- search in widely used search engines rather than in medical search engines
- search terms used might differ from those patients would chose
- no patient was included in trial design, selection of materials and quality assessment
- DISCERN does not take the accuracy of the information into account

8 Outlook

It is evident that unbiased, reliable, comprehensive and accurate information is becoming more and more important in times of SDM and that the quantity and importance of information provided via the internet is steadily increasing. Thus, one focus on future patient information has to deal with educating the patient on where to find reliable and unbiased information and to focus on improving health literacy in order to enable patients to understand the information provided and the medical and statistical terms used that are, to a certain extent, necessary and inevitable.

Further, available criteria determining the quality of written consumer health information have to be incorporated in the development of patient information, knowing that not all criteria apply to each topic. Thereto analogous the postulation on the advancement of an instrument to comprehensively and reliably assess the quality of consumer health information has to be raised. Which admittedly is, due to the complexity of the construct “quality of written consumer health information”, a challenging task.

need for unbiased, reliable, comprehensive and accurate information is increasing

consider quality criteria of information materials already in the development

9 References

1. Baumgart, J., *Ärzte und Informierte Patienten - Ambivalentes Verhältnis*. Deutsches Ärzteblatt, 2010. **107**(51-52): p. 2554-2556.
2. Linden, M., H. Gothe, and M. Ryser, *Umfrage zur Patienteninformation "Was man schwarz auf weiß besitzt ..."*. Deutsches Ärzteblatt, 1999. **96**(14): p. A-914 - 916.
3. Isfort, J., B. Floer, and M. Butzlaff, "*Shared Decision Making*" - *partizipative Entscheidungsfindung auf dem Weg in die Praxis*, in *Gesundheitsmonitor 2004 - Die ambulante Versorgung aus Sicht von Bevölkerung und Ärzteschaft*, J. Böcken, B. Braun, and M. Schnee, Editors. 2004, Verlag Bertelsmann Stiftung: Gütersloh. p. 88-100.
4. Steckelberg, A., et al., *Gesundheitsinformation in Deutschland - Ein Überblick zu Anforderungen, Angeboten und Herausforderungen* 2011, Koeln: Gesellschaft für Versicherungswissenschaft und -gestaltung e.V.
5. Steckelberg, A., et al., *Kriterien für evidenzbasierte Patienteninformation*. Z. ärztl. Fortbild. Qual. Geundh.wes., 2005(99): p. 343-351.
6. Bunge, M., I. Mühlhauser, and A. Steckelberg, *What constitutes evidence-based patient information? Overview of discussed criteria*. Patient Education and Counseling, 2010(78): p. 316-328.
7. The Pharmaceutical Forum. *Recommendations to enhance access to information on diseases and treatment options in healthcare settings*. [18.01.2012]; Available from: http://ec.europa.eu/pharmaforum/docs/itp_recommendations_en.pdf.pdf.
8. World Health Organisation. *Health Promotion Glossary*. 1998 [14.03.2012]; Available from: http://www.who.int/hpr/NPH/docs/hp_glossary_en.pdf.
9. Nutbeam, D., *Health literacy as a public health goal: a challenge for contemporary health education and communication strategies into the 21st century*. Health Promotion International, 1998. **15**(3): p. 259-268.
10. Rudd, R., et al., *Health Literacy: An Update of Medical and Public Health Literature*, in *Review of Adult Learning and Literacy*, J. Comings, B. Garner, and C. Smith, Editors. 2007, Lawrence Erlbaum Associates: Mahway NJ. p. 175-204.
11. Gerber, D., *Targeted Therapies: A New Generation of Cancer Treatments*. Am Fam Physician, 2008. **77**(3): p. 311-319.
12. National Cancer Institute. *Targeted Cancer Therapies*. 2011 [4.9.2011]; Available from: <http://www.cancer.gov/cancertopics/factsheet/Therapy/targeted>.
13. O'Neill, V. and C. Twelves, *Oral cancer treatment: developments in chemotherapy and beyond*. British Journal of Cancer, 2002. **87**: p. 933-937.
14. Ruddy, K., E. Mayer, and A. Partridge, *Patient Adherence and Persistence with Oral Anticancer Treatment*. CA Cancer J Clin, 2009. **59**: p. 56-66.
15. Charnock, D., et al., *DISCERN: an instrument for judging the quality of written consumer health information on treatment choices*. J Epidemiol Community Health, 1999. **53**: p. 105-111.
16. IPDAS Collaboration. *IPDAS Criteria for Judging the Quality of Patient Decision Aids*. 2005 [cited 4.5.2011; Available from: www.ipdas.ohri.ca.]
17. Baccarani, M., et al., *Evolving concepts in the management of chronic myeloid leukemia: recommendations from an expert panel on behalf of the European LeukemiaNet*. Blood, 2006. **108**(6): p. 1809-1820.

18. Allen-Bard, S., *Suboptimal responses to imatinib in chronic myelogenous leukemia: what are they and how do they affect treatment?* Clin J Oncol Nurs, 2009. **13**(5): p. 537-542.
19. Baccarani, M., et al., *Chronic myeloid leukemia: an update of concepts and management recommendations of European LeukemiaNet.* J Clin Oncol, 2009. **27**(35): p. 6041-6051.
20. Hughes, T.P., et al., *ENESTnd Update: Continued Superiority of Nilotinib Versus Imatinib In Patients with Newly Diagnosed Chronic Myeloid Leukemia In Chronic Phase (CML-CP).* ASH Annual Meeting Abstracts, 2010. **116**(21): p. 207.
21. Saglio, G., et al., *Nilotinib versus imatinib for newly diagnosed chronic myeloid leukemia.* N Engl J Med, 2010. **362**(24): p. 2251-9.
22. Kantarjian, H., et al., *Dasatinib versus imatinib in newly diagnosed chronic-phase chronic myeloid leukemia.* New England Journal of Medicine, 2010. **362**(24): p. 2260-2270.
23. Shah, N., et al., *Dasatinib Versus Imatinib In Patients with Newly Diagnosed Chronic Myeloid Leukemia In Chronic Phase (CML-CP) In the DASISION Trial: 18-Month Follow-up.* ASH Annual Meeting Abstracts, 2010. **116**(21): p. 206-.
24. D'Antonio, J., *Chronic myelogenous leukemia.* Clin J Oncol Nurs, 2005. **9**(5): p. 535-538.
25. National Cancer Institute. *SEER Stat Fact Sheets: Leukemia.* 2011 [17.2.2012]; Available from: <http://seer.cancer.gov/statfacts/html/leuks.html>.
26. *Pschyrembel - Klinisches Wörterbuch*, 1998, Walter de Gruyter: Berlin New York. p. 915-916.
27. Silver, R.T., et al., *An evidence-based analysis of the effect of busulfan, hydroxyurea, interferon, and allogeneic bone marrow transplantation in treating the chronic phase of chronic myeloid leukemia: developed for the American Society of Hematology.* Blood, 1999. **94**(5): p. 1517-36.
28. Van Etten, R. *Clinical manifestations and diagnosis of chronic myeloid leukemia.* 2011 [30.1.2012]; Available from: http://www.uptodate.com/contents/clinical-manifestations-and-diagnosis-of-chronic-myeloid-leukemia?source=search_result&search=cml&selectedTitle=1%7E141.
29. An, X., et al., *BCR-ABL tyrosine kinase inhibitors in the treatment of Philadelphia chromosome positive chronic myeloid leukemia: A review.* Leukemia Research, 2010. **34**(10): p. 1255-1268.
30. National Comprehensive Cancer Network. *NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines) Chronic Myelogenous Leukemia Version 2.2012.* 2012 [30.1.2012]; Available from: http://www.nccn.org/professionals/physician_gls/pdf/cml.pdf.
31. European Medicines Agency. *Glivec (Imatinib) - Initial Marketing Authorisation Documents.* 2001 [30.01.2012]; Available from: http://www.ema.europa.eu/docs/en_GB/document_library/EPAR_-_Procedural_steps_taken_before_authorisation/human/000406/WC500022204.pdf.
32. US Food and Drug Administration. *Drug Approval Package - Gleevec (Imatinib Mesylate) Capsules* 2001 [30.1.2012]; Available from: http://www.accessdata.fda.gov/drugsatfda_docs/nda/2001/21335_Gleevec.cfm.
33. Marin, D., et al., *Adherence is the critical factor for achieving molecular responses in patients with chronic myeloid leukemia who achieve complete cytogenetic responses on imatinib.* J Clin Oncol, 2010. **28**(14): p. 2381-2388.

34. Winker, M., et al., *Guidelines for Medical and Health Information Sites on the Internet. Principles Governing AMA Web Sites*. JAMA, 2000. **283**(12): p. 1600-1606.
35. Köpke, S., et al., *In Deutschland gebräuchliche Bewertungsinstrumente für Patienteninformation - eine kritische Analyse*. ZaeFQ, 2005(99): p. 353-357.
36. International Organization for Standardization Technical Committee ISO/TC 176, *Quality management and quality assurance- Vocabulary*, in *ISO 8402*, I.O.f. Standardization, Editor 1994: Geneva.
37. Eysenbach, G. and T.L. Diepgen, *Towards quality management of medical information on the Internet: evaluation: labelling, and filtering of information*. BMJ, 1998. **317**: p. 1496-1500.
38. *eEurope2002: Quality Criteria for Health related Websites*. J Med Internet Res, 2002. **4**(3): p. e15.
39. The Pharmaceutical Forum. *Core quality principles for patient information on diseases and treatment options*. [18.01.2012]; Available from: http://ec.europa.eu/pharmaforum/docs/itp_quality_en.pdf.
40. The Pharmaceutical Forum. *Methodology of use of the core quality principles on information to patients*. 2007 [18.01.2012]; Available from: http://ec.europa.eu/pharmaforum/docs/itp_methodo_en.pdf.
41. Saenger, S., et al. *Check-In - Instrument zur Bewertung von gedruckten und elektronischen Gesundheitsinformationen. Anwendungsbeschreibung*. 2004 [10.5.2011]; Available from: http://www.patienten-information.de/patientenbeteiligung/check_in.pdf.
42. Gigerenzer, G., et al., *Helping Doctors and Patients Making Sense of Health Statistics*. Psychol. Sci. Publ. Interest, 2007. **8**: p. 53-96.
43. Trevena, L.J., et al., *A systematic review on communicating with patients about evidence*. J Eval Clin Pract, 2006. **12**(1): p. 13-23.
44. Muehlhauser, I. and F. Oser, *Sind medizinische und Gesundheitsinformationen auf den Internetseiten von Wikipedia evidenzbasiert? - Eine Inhaltsanalyse*. Z.Evid.Fortbild.Qual Gesundh.wesen (ZEFQ), 2008. **102**: p. 441-448.
45. The Information Standard. *About The Information Standard*. 2011 [18.12.2011]; Available from: <http://www.theinformationstandard.org/about>.
46. Health On the Net Foundation. *The services offered by HON*. 2011 [18.12.2011]; Available from: <http://www.hon.ch/>.
47. Aktionsforum Gesundheitsinformationssysteme (afgis) e.V. *Aktionsforum Gesundheitsinformationssysteme (afgis) e.V.* 2011 [18.12.2011]; Available from: <http://www.afgis.de/>.
48. Riegler, A. and G. Bachinger, *Praxisleitfaden - Wie finde ich seriöse Gesundheitsinformation im Internet?*, in <http://www.patientenanwalt.com/publikationen/patientenrechte-und-bewohnerrechte.html>, Land Niederösterreich (NÖ Patienten- und Pflegeanwaltschaft), Editor 2011, Land Niederösterreich: St. Pölten.
49. Coulter, A., et al., *Assessing the quality of information to support people in making decisions about their health and healthcare*, 2006, Picker Institute Europe: Oxford
50. The AGREE Collaboration, *Development and validation of an international appraisal instrument for assessing the quality of clinical practice guidelines: the AGREE project*. Qual Saf Health Care, 2003. **12**: p. 18-23.
51. Elwyn, G., et al., *Assessing the Quality of Decision Support Technologies Using the International Patient Decision Aid Standards instrument (IPDASi)*. PLoS ONE, 2009. **4**(3): p. e4705.

52. O'Connor, A.M., et al., *Decision aids for people facing health treatment or screening decisions*. Cochrane Database Syst Rev, 2003(2): p. CD001431.
53. Biermann, S.J., et al., *Evaluation of Cancer Information on the Internet*. Cancer, 1999. **86**(3): p. 281-290.
54. Jansen, B.J. and A. Spink, *How are we searching the World Wide Web? A comparison of nine search engine transaction logs*. Information Processing and Management, 2005(42): p. 248-263.
55. Marel, S.v.d., et al., *Quality of Web-based Information on Inflammatory Bowel Disease*. Inflamm Bowel Dis, 2009. **15**(12): p. 1891-1896.
56. O'Brien, I., L. Lambie, and S. Stacy-Baynes, *Is quality cancer information available for consumers in New Zealand? A national stocktake and review of written consumer health information*. NZMJ, 2009. **122**(1294): p. 23-32.
57. Hirasawa, R., et al., *Quality of Internet Information related to the Mediterranean diet*. Public Health Nutrition, 2011. **FirstView Article**: p. 1-9.
58. Charnock, D., *DISCERN Handbook - Quality criteria for consumer health information on treatment choices*, 1998.
59. RCSEQ. *Research Committee on Scientific and Ethical Questions - Home*. 2011 [30.1.2012]; Available from: <http://www.umat.at/page.cfm?vpath=universitaet/rcseq/home&expanddiv=subMenuItem14058>.
60. Bortz, J., *Statistik für Human- und Sozialwissenschaftler*. Vol. 6. Auflage. 2005, Heidelberg: springer Medizin Verlag Heidelberg.
61. Eysenbach, G., et al., *Empirical Studies Assessing the Quality of Health Information for Consumers on the World Wide Web*. JAMA, 2002. **287**(20): p. 2691-2700.
62. Khazaal, Y., et al., *HON Label and DISCERN as Quality Indicators of Health-Related Websites*. Psychiatr Q, 2011.
63. Health On the Net Foundation. *Methodology - What the HONcode cannot do*. 2012 [17.03.2012]; Available from: <http://www.hon.ch/HONcode/Pro/method.html>.

10 Appendix

Table 10-1: List of institutions contacted directly for written patient information on CML

Name	Country	Website	Inclusion (yes/no)
ACCESS Cancerlink	The Netherlands	http://www.access-nl.org/our_services/cancer_support.htm	No - provide no patient info on CML
AEAL- Asociación Española de Afectados por Linfomas, Mielomas y Leucemias	Spain	http://www.aeal.es/	No - language
American Cancer Society	USA	www.cancer.org	Yes
Arbeitsgemeinschaft für Internistische Onkologie (AIO)	Germany	http://www.aio-portal.de	No - provide no patient info on CML
Arcus-Onko Centrum	Czech Republic	http://arcus-oc.org/	No - language
Asociacion Espanola Contra el Cancer (AECC)	Spain	https://www.aecc.es/Paginas/PaginaPrincipal.aspx	No - language
Asociatia Romana impotriva Leucemiei (A.R.i.L.)	Romania	http://www.aril.ro/	No - language
Associação Portuguesa contra a Leucemia	Portugal	http://www.apcl.pt/	No - language
Associação Portuguesa de Leucemias e Linfomas	Portugal	http://www.apll.org/teste/	No - language
Association for help in treatment of patients with CML	Macedonia	Not accessible (retrieved via www.cmladvocates.net)	No - language
Association Laurette Fugain	France	http://www.laurettefugain.org/	No - language
Association of cancer patients from Romania (ABC)	Romania	http://www.srcjro.org/index_en.htm	No - language
Association of European Cancer Leagues (ECL)	Europe	http://www.europeancancerleagues.eu/	No - provide no patient info on CML
Association of People Suffering from CML	Bulgaria	http://www.hml-bg.com/	No - language
Association of Support for Leukemia Patients (Leikemijas slimnieku atbalsta biedriba)	Latvia	www.leikemija.lv	No - language
Association P.A.V.E.L.	Romania	http://www.asociatiapavel.ro	No - provide no patient info on CML
Associazione Italiana Contro le Leucemie (AIL)	Italy	http://www.ail.it/	No - language
Associazione Italiana Malati di Cancro	Italy	http://www.aimac.it/	No - language
Associazione Malati Oncologici (AMO)	Italy	http://www.associazionemalati oncologici.org/	No - language
Associazione per il sostegno oncologico	Italy	http://www.aseop.it	No - language
"Birlikde" Leukemia Patients Support Organisation	Azerbaijan	www.leykemiya.az	No - language
Blodcancerförbundet	Sweden	http://www.blodcancerforbundet.se/	No - language
Blood Cell Foundation for children with cancer diseases	Poland	http://www.krwinka.org/	No - language
Bradford Cancer Support	UK	http://www.bradfordcancersupport.org.uk/	No - provide no patient info on CML

Name	Country	Website	Inclusion (yes/no)
Bristol Mayer Squibb	Austria / International	http://www.bms.at/index.php?set_language=de&cccpage=bms_willkommen	Yes
Bulgarian Association for Patients Defense	Bulgaria	http://www.patient.bg/index_en.php?page_id=15	No - language
Cancer Care	UK	http://www.cancercare.org.uk/	No - duplicate
Cancer Equality	UK	http://www.cancerequality.org.uk/	No - provide no patient info on CML
Cancer Information and Support Service	UK	http://www.cancerinformation.org.uk/	No - provide no patient info on CML
Cancer Patients Society of Macedonia-Thrace	Greece	http://afroditi.uom.gr/skmth/	No - language
Cancer Research UK	UK	http://www.cancerresearchuk.org/	Yes
Cancer.Net	USA	http://www.cancer.net/patient/Cancer+Types/Leukemia+-+Chronic+Myeloid+-+CML	Yes
Cancerfonden	Sweden	http://www.cancerfonden.se	No - language
Central European Leukemia Study Group (CELSG)	Europe	http://www.cml-info.com/	Yes
Children with Cancer	UK	http://www.childrenwithcancer.org.uk/	No - provide no patient info on CML
Children with CML	UK	http://www.childrenwithcml.org.uk/home.asp?parent_id=1	No - duplicate
Children's Cancer and Leukaemia Group (CCLG)	UK	http://www.cclg.org.uk/index.php	No - provide no patient info on CML
Chronic Myeloid Leukemia	Canada	http://www.cmleukemia.com/index.html	No - provide no patient info on CML
CML & GIST Beteg Egyesület	Hungary	http://www.cmlgist.hu/	No - language
CML Advocates Network	Ireland	http://cmladvocates.net/	No - duplicate
CML Alliance	by Novartis	http://www.cmlalliance.net/novartis-commitment/faqs.jsp	Yes
CML Association of Serbia	Serbia	http://www.cml.rs/	No - language
CML Support	UK	http://www.cmlsupport.org.uk/	No - FAQs and video
CML-Info	Austria	http://www.cml-info.com/de.html	Yes
Croatia Leukemia and Lymphoma Society (HULL: Hrvatska udruga leukemija i limfomi)	Croatia	http://www.hull.hr/	No - language
Deutsche Gesellschaft für Hämatologie und Onkologie e. V. (DGHO)	Germany	http://www.dgho.de/	No - provide no patient info on CML
Deutsche Krebshilfe e.V.	Germany	http://www.krebshilfe.de/	Yes
Diagnoza CML	Czech Republic	http://diagnoza-cml.cz/	No - language
Die Leukämiehilfe Rhein-Main g.e.V	Germany	http://www.leukaemiehilfe-rhein-main.de/	No - provide no patient info on CML
Eesti Leukeemia ja Lümfoomihagete Liit (Estonian Leukaemia and Lymphoma Patients Society)	Estonia	http://www.leukeemia.ee/	No - language

Name	Country	Website	Inclusion (yes/no)
Estonian Cancer Society	Estonia	http://www.cancer.ee/?op=body&id=15&cid=	No - provide no patient info on CML
EUROCARE	Europe	http://www.eurocare.it/	No - provide no patient info on CML
European Action Against Rare Cancers	Europe	http://www.rarecancers.eu/	No - provide no patient info on CML
European Cancer Observatory	Europe	http://eu-cancer.iarc.fr/	No - provide no patient info on CML
European Cancer Organisation (ECCO)	Europe	http://www.ecco-org.eu/	No - provide no patient info on CML
European Cancer Patient Coalition	Europe	http://www.ecpc-online.org/	No - provide no patient info on CML
European Leukemia Information Center (ELIC)	Europe	http://www.kompetenznetz-leukaemie.de	Yes
European Organisation for Research and Treatment of Cancer (EORTC)	Europe	http://www.eortc.org/	No - provide no patient info on CML
European Society for Medical Oncology (ESMO)	Europe	http://www.esmo.org/	No - provide no patient info on CML
"Fighting and Preventing Lymphoma and Leukemia" Leukemia Association	Romania	www.leukemia.ro	No - language
Flemish Cancer League	Belgium	http://www.tegenkanker.be/	No - language
Fondation Cancer	Luxembourg	http://www.cancer.lu/	No - provide no patient info on CML
Fondation Contre le Cancer	Belgium	http://www.cancer.be/	No - language
France Federation Leucemie Espoir	France	http://www.leucemie-espoir.org/	No - language
German Cancer Society (DKG)	Germany	http://www.krebsgesellschaft.de/	Yes
German Leukemia and Lymphoma Aid (DLH, Deutsche Leukämie- und Lymphom-Hilfe e.V.)	Germany	http://www.leukaemie-hilfe.de/	Yes
Gruppo Ail Pazienti Leucemia Mieloide Cronica	Italy	http://www.lmconline.it	No - language
Hungarian League Against Cancer	Hungary	http://www.rakliga.hu/	No - language
International Agency for Research in Cancer	International	http://www.iarc.fr/	No - provide no patient info on CML
International Chronic Myeloid Leukemia Foundation (iCMLf)	Europe	http://www.cml-foundation.org/	No - provide no patient info on CML
Irish Cancer Society	Ireland	http://www.cancer.ie/	Yes
Kankerbestrijding/KWF	The Netherlands	http://www.kwfkankerbestrijding.nl/Pages/Home.aspx	No - language
Kosovo Association for Supporting Chronic Leukemia Patients	Kosovo	Not accessible (retrieved via www.cmladvocates.net)	No - language
Kraeftens Bekaempelse (Danish Cancer Society)	Denmark	http://www.cancer.dk/om+os/The+Danish+Cancer+Society.htm	No - language
Krebsliga Schweiz	Switzerland	http://www.krebsliga.ch	Yes

Name	Country	Website	Inclusion (yes/no)
Krebspatienten-Info (Initiative der OeGHO)	Austria	http://www.krebspatienten.info ODER http://bluterkrankungen.info	No - duplicate
La Ligue Nationale Contre le Cancer	France	http://www.ligue-cancer.net/	No - language
Latvian Support Society for Oncology Patients "Dzīvības koks"	Latvia	http://www.dzivibaskoks.lv/	No - language
League Against Cancer Prague	Czech Republic	http://www.lpr.cz	No - language
League Against Cancer Slovakia	Slovakia	http://www.lpr.sk/	No - language
Leucemia CARE	UK	http://www.leukaemiacare.org.uk/1/home.html	No - provide no patient info on CML
Leucemie espoir o6	France	http://www.leucemie-espoir.org/spip.php?rubrique113	No - language
Leukaemia & Lymphoma Research	UK	http://www.beatbloodcancers.org/	Yes
Leukämie Kompetenznetz	Germany	http://www.kompetenznetz-leukaemie.de/content/home/	Yes
Leukämie-Online / LeukaNET	Germany	http://www.leukaemie-online.de/	NO - provide no patient info on CML; exchange portal
Leukemia & Lymphoma Society - fighting blood cancers	Canada	http://www.lls.org	Yes
LMC France	France	http://lmcfrance.jimdo.com/	No - language
LYLE, Association for lymphatic cancer and leukemia	Denmark	http://www.cancer.dk/lyle/	No - language
Macmillian Cancer Support	UK	http://www.macmillan.org.uk/Home.aspx	Yes - duplicate (internet search)
Mayo Clinic	USA	http://www.mayoclinic.com/health/chronic-myelogenous-leukemia/D500564	Yes
National Association of Patients with Oncological Diseases (APOZ)	Bulgaria	http://oncobg.info/	No - language
National Cancer Research Network	UK	http://www.ncrn.org.uk/	No - provide no patient info on CML
National CML Society	USA	www.nationalcmlsociety.org	Yes
Norwegian Cancer Society	Norway	http://www.kreftforeningen.no/english	No - language
Novartis	Austria / International	http://www.glivec.com/index.jsp	No - duplicate
Novartis	Austria / International	http://www.novartis.at/index.shtml	No - duplicate
Oncosuisse	Switzerland	http://www.oncosuisse.ch/	No - provide no patient info on CML
Organisation of European Cancer Institutes	Europe	http://www.oeci-eeig.org/	No - provide no patient info on CML
OSANNA	Ukraine	http://osanna.com.ua/	No - language
Österreichische Krebshilfe	Austria	http://www.krebshilfe.net/home.shtm	No - provide no patient info on CML
PASYKAF - The Cyprus Association of Cancer Patients and Friends	Cyprus	http://www.pasykaf.com/	No - language
Patient Association of Rare Oncological Diseases	Lithuania	http://www.nonasoft.lt/Rolld/	No - language

Name	Country	Website	Inclusion (yes/no)
Patientenforum	Switzerland	http://www.patientenforum.ch/	No - provide no patient info on CML
Patients Association	UK	http://www.patients-association.com/	No - provide no patient info on CML
Polskie Stowarzyszenie Pomocy Chorym na Szpiczaka	Poland	http://www.szpiczak.org.pl	No - language
Rarer Cancers Foundation	UK	http://www.rarercancers.org.uk/	No - provide no patient info on CML
Romanian Cancer League	Romania	www.romaniacancerleague.org	No - language
SCL Stichting Contactgroep Leukemie	The Netherlands	http://www.leukemie.nfk.nl/	No - language
Slovenian lymphoma and leukemia patient association, L&L	Slovenia	http://www.limfom-levkemija.org/	No - language
Society of Oncolhaematological Patients "Kraujas"	Lithuania	http://www.kraujas.lt/	No - language
Sodeystvie (Assistance)	Russia	http://www.sodeystvie-cml.ru/	No - language
Stiftung zur Förderung der Knochenmarktransplantation (SFK)	Switzerland	www.knochenmark.ch	Yes
Swiss Group for Clinical Cancer Research (SAKK)	Switzerland	http://sakk.ch/en/	No - provide no patient info on CML
The European Association for Cancer Research (EACR)	Europe	http://www.eacr.org/	No - provide no patient info on CML
The European LeukemiaNet	Europe	http://www.leukemia-net.org/content/home/	No - provide no patient info on CML
The Finnish CML Patient Network	Finland		No - page not accessible
The Nationwide Association for CML Patient Aid (Stowarzyszenie PBS)	Poland	http://www.spbs.com.pl/	No - language
Vivre avec la LMC	France	http://vivreaveclalmc.org/	No - language

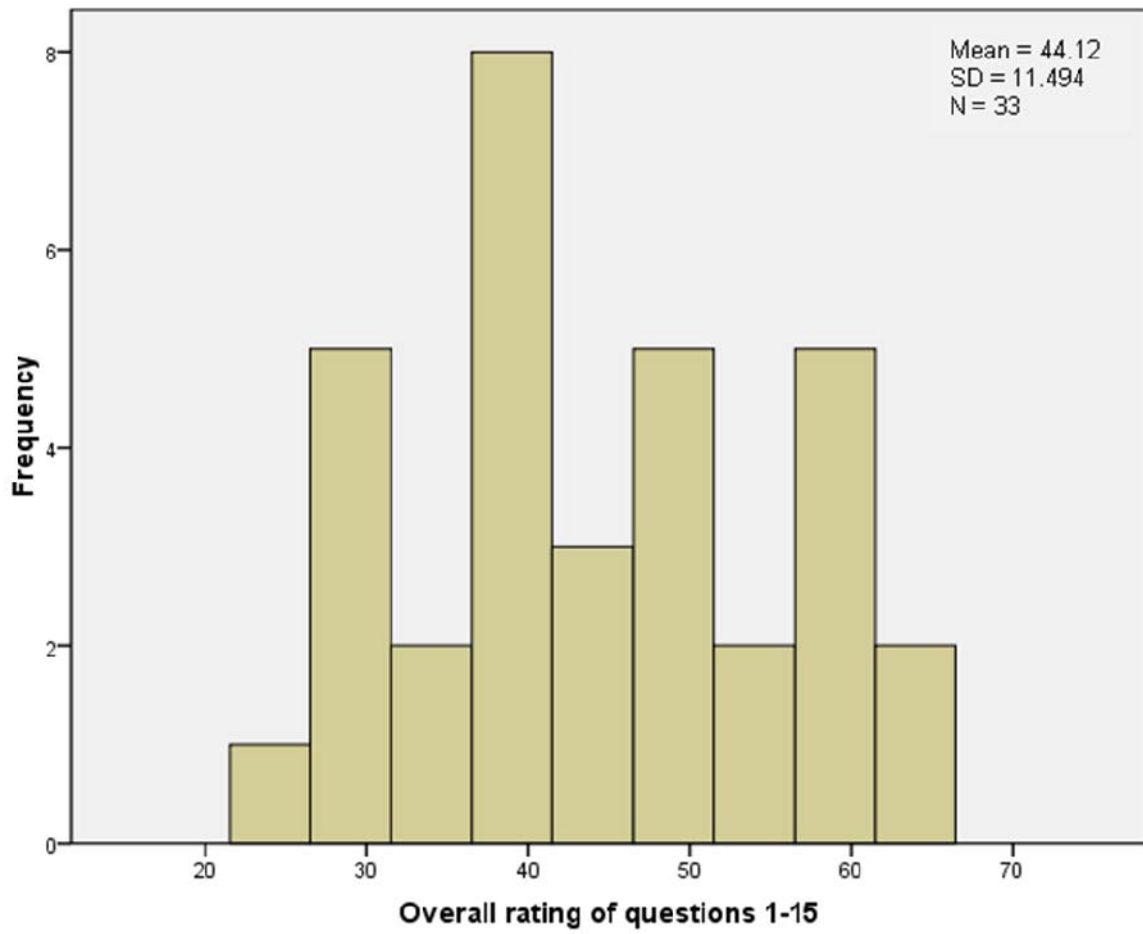


Figure 10-1: Distribution of the overall DISCERN rating across included information materials