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Analysis of the need for a mobile application to support family caregivers of patients with incurable cancer – The development of the "Angehörigen-App": a qualitative study in Switzerland

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Summary

BACKGROUND: The prevalence of cancer is rising continuously worldwide. Relatives play an important role in caring for cancer patients and are at the same time affected by the illness and treatment of their loved ones. They have often been referred to as a forgotten group. Advances in digital technology offer various opportunities to enhance the well-being of and care for relatives.

OBJECTIVES: The aim of the study was to investigate the utility of a mobile application to support the relatives of palliative cancer patients in Switzerland, the potential content elements of such an app, and its optimal functional and structural design.

METHOD: Using a purposive sampling strategy, three focus group discussions were conducted at the University Hospital of Bern. The 15 participants included both relatives and experts. Data was analysed using content structuring qualitative content analysis according to Kuckartz and Rädiker.

RESULTS: Statements from the focus groups were summarised in four main categories. These included statements from participants about the need for and potential benefits of an app, such as resource gains or easier access to care. Statements regarding possible content components of the app, such as tools for professional support and coordination or the provision of information, were also summarised. Statements were also included on the necessary functional features and the structural embedding of the app.

CONCLUSIONS: The results indicate a need for a caregivers app in Switzerland. The app should reduce gaps in care, focus on family members, and strengthen their empowerment and access to resources. In terms of content, bundled information, low-threshold support offers, coordination tools, and self-care options should be guaranteed. The modular and simply structured app should be designed in a needs-oriented manner to be used safely throughout Switzerland.

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Introduction

The global prevalence of cancer has increased in recent years, a trend also seen in the Swiss population [1], and further increases are expected [2]. Despite improved treatment options, the number of patients with incurable disease, and thus the absolute number of deaths per year, is also increasing. Oncology guidelines not only provide standards for the care of patients but also emphasise the importance of support for their relatives [3]. In a meta-analysis of 85 included studies, Pan and Lin [4] report an approximate 42% prevalence of depressive symptoms in family caregivers of patients in the palliative stage. In a study by Rosenberger et al. [5], 95% of family caregivers registered at an outpatient care centre reported elevated stress scores on the Distress Thermometer, a screening instrument for psychosocial distress [6, 7]. However, only 21% reported seeking psycho-oncology treatment [5]. This treatment gap is particularly regrettable, as various interventions have been shown to reduce the psychological and psychosocial stress of relatives and have a positive effect on their quality of life [8]. This makes it even more important to identify and reduce the gap between the significant psychosocial symptom load and the active search for support. Various barriers, such as lack of information or time and resource constraints, may be reasons for this gap [9]. Relatives, in particular, are often neglected in care, partly due to a lack of resources, although they face enormous challenges in various phases of the disease process [10]. In addition, there is a lack of low threshold services in outpatient and intermediate settings, and of the quickly accessible services necessary in crises. Factors specific to certain groups, such as low socioeconomic status, migration background, living in a rural environment, or state of health due to illness, also contribute to increased difficulty in accessing services [11].

One option to overcome such barriers is offered by the continuing digitalisation of the healthcare sector [12]. In a narrative review, Springer and Mehnert-Theuerkauf [13] summarise different mobile health (mHealth) applications in the field of psycho-oncology, reporting them to be a good addition to face-to-face psycho-oncological therapy. Lack of evidence regarding the effectiveness of mHealth applications is still a fundamental problem [14]; this also applies to apps for family caregivers [15]. Meanwhile, the majority of applications is tailored to patients and do not focus on their caregivers [16]. Even among apps that have been developed specifically for family caregivers, most are designed primarily to assist family caregivers in supporting patients rather than to support the caregivers themselves [17].

The aim of this qualitative study was to determine the need among family caregivers and professionals for an mHealth application in the form of a mobile app, which could help to reduce distress in relatives and open up low threshold access for professional support.

Materials and methods

Study design

This was a qualitative study which used focus group interviews. The research questions aimed to determine the need for a digital application in the area of care for relatives of palliative cancer patients and the potential requirements of such an app. A qualitative study design was particularly suitable for this, as it allowed the experiences and expertise of the participants to be recorded as openly and exploratively as possible. As a result, no hypotheses were made in advance, and the research questions were designed to be open [18]. The qualitative study design also enabled a holistic recording of the subjective considerations of the participants as well as their systematic analysis and interpretation.

Sampling and recruitment

For the three planned focus groups, a group size of seven people was targeted, stemming from theoretical considerations regarding the group composition of people with expert status. Preferably, each group was to consist of two patient relatives and one specialist from each of the fields of psychology, nursing, social work, medicine and medical informatics.

To achieve more diverse results, linguistically diverse focus groups were conducted to ensure representation of the different language regions of Switzerland in the data collection. The two most populated language regions of Switzerland were covered by including German and French speakers, with the largest, German-speaking, population the most represented.

Flyers with study information were distributed in the outpatient clinic of the medical oncology department at Inselspital Bern and sent to contact persons of the Cancer League Bern.

People with expert status, referred by the psycho-oncology team at Inselspital Bern, were approached. Eligible participants were recruited by email and telephone by an independent person (neither a colleague nor healthcare professional involved in the care for the sick family member of the participant).

Data collection

Data was collected using focus group interviews. A focus group is defined as a moderated discourse on a specific topic and can be used to investigate unknown topics or to present exploratory questions of different theoretical backgrounds [19]. According to Bär et al. [20], needs analyses and idea generation are appropriate applications of focus groups, favoured by the advantages of group dynamics.

A guideline was developed for the interviews based on the phases of group dynamic processes of focus groups [21]. The interview guideline was developed based on related topics derived from literature. For example, the eHealth Suisse criteria catalogue [22] was included. The questions also aimed to identify the gaps in care for relatives that emerged from literature and to generate ideas for digital solutions. As a further source of ideas for the discussion, examples of existing apps were shown.

The focus groups were conducted in May 2023 at Inselspital Bern and moderated by a master's student with the support of another master's student as co-moderator. The discussions were audio-taped so that the collected data could be further processed.

Data analysis

First, the recordings were transcribed using the simplified transcription according to Kuckartz [23]. The interviews with the German-language groups were transcribed directly into written German. The French-language group interview was first transcribed and then translated into German using the online tool DeepL and checked by a bilingual person.

The transcripts were then analysed using qualitative content analysis [24]. Main categories were established inductively, based on the theoretical background information and the interview guide. The transcribed data material, consisting of 287 text passages, was coded using these defined main categories. Subcategories were derived both inductively and deductively from the transcripts.

The derivation of the category system and the coding of the data was carried out by one master's student in close consultation with the project leader, an expert in qualitative research.

MAXQDA 2022 Analytics Pro software [25] was used as part of the qualitative content analysis to support the transcription of the audio files and coding.

Ethical considerations

No health-related data were collected or analysed during the needs assessment, meaning the study does not fall under the Human Research Act. For this reason, the Cantonal Ethics Committee for Research of the Canton of Bern required no further action on the ethics request. Nevertheless, the needs analysis was conducted in compliance with the guidelines of Good Clinical Practice [26], which also included obtaining informed consent from the participants. Participants were informed about the voluntary nature of

the study and that they could withdraw from the study at any time without giving a reason.

Results

Participants

Three focus groups lasting between 70 and 100 minutes were conducted to collect data for this study. Two of these involved German-speaking participants, and one was conducted in French. The main socio-demographic details of the focus group participants, collected in advance by questionnaire, are listed in table 1. A total of n = 15 people took part in the focus groups. There were six participants in the first German-speaking group and five in the second. The French-speaking group consisted of four participants. Across all groups, the focus group participants had a mean age of 47.73 years (Standard deviation: 8.10 years, range: 31–58 years). In focus groups 1 and 3, the gender distribution was balanced. In focus group 2, there was a 4 to 1 ratio of female to male participants.

Category system

A category system consisting of four main categories and corresponding subcategories was developed for a total of 287 text passages;the categories were derived partly inductively and partly deductively. Figure 1 gives an overview of the category system. The main categories are discussed in more detail in the following sections.

Content – What content elements should the app include?

The requirements regarding content elements of the app are summarised in the category *content*. According to the participants, the app should be used to provide relatives with information. This could cover various topics, although a specific focus should be placed on legal information. In principle, the information does not necessarily have to be directly accessible in the app, but could also be linked to. Summarising the provided information was considered particularly important.

" And an app like this could at least bundle the information. "(Psycho-oncologist, focus group 1)

Furthermore, the information content should appeal to different learning styles, such as visual and auditory, and not just be available in a written form.

Another element of the app's content should be support for relatives. The focus group participants mentioned the general need for support, which could, for example, involve assistance from specialists for yet unanswered questions, or organisational options for concrete and practical support, such as help for setting up a night watch. In addition, the need for fast and constant availability was expressed several times. Digital applications were seen as an opportunity in this context.

"I feel like I should be able to reach someone at any time to help me with questions. If I have something, I should be able to call a phone number or use an app to get in contact with someone." (Medical IT specialist, focus group 2)

The integration of an emergency button in the app was also discussed as a concrete solution for constant availability. The feasibility of implementation must be clarified in advance, as accessibility in emergencies must be guaranteed at all times if the decision is made to integrate such an application.

The integration of self-care tools into the app was also mentioned several times. For example, intervention options of meditation or self-hypnosis, which are already integrated with other apps, were discussed. Furthermore, general ideas were suggested to distract relatives from the stresses of everyday life and to show them ways to find relief or relaxing moments.

Another suggested content element of the app was a focus on the planning and coordination of care, covering various

Table 1:
Socio-demographic information on the participants.

Focus group	Gender	Age (years)	Profession	Relative	Attitude towards digital applications
German-speaking groups					
1	Female	57	Registered nurse	R	→
1	Male	52	Psycho-oncologist		→
1	Female	45	Registered nurse		→
1	Female	52	Social worker	R*	→
1	Male	33	Medical IT specialist	R*	↑
1	Male	44	Oncologist	R*	→
2	Female	38	Registered nurse	R	→
2	Female	54	Psycho-oncologist		→
2	Female	50	Nurse with additional expertise	R*	→
2	Female	58	Social worker		↑
2	Male	55	Medical IT specialist		↑
French-speaking group					
3	Female	54	Music therapist		→
3	Female	45	Nurse with additional expertise		↑
3	Male	48	Social worker		→
3	Male	31	Resident		→

R: invited as a relative; R*: invited in a different expert role, but also a relative.

Selection options for the question on attitudes towards digital applications assessed with sociodemographic data: I use digital applications, whenever possible (↑); as long as they make my everyday life easier (→); only if there are no analogue alternatives (↓).

aspects such as planning appointments with healthcare professionals.

"Because they were simply overwhelmed with coordinating all the appointments that came with the illness." (Registered nurse, focus group 1)

More general topics were also discussed, such as coordination between relatives, patients and specialists, planning over the entire course of the illness, and future care planning.

One content-related element discussed that proved very controversial was the opportunity to make contact with peers. Positive aspects, such as the exchange of experiences and information, were seen to potentially conflict with negative aspects, such as the risk of negative group dynamics.

There was a consensus among the participants that any opportunities for exchange, such as chats and forums, should be managed professionally and on an ongoing basis.

"And I would be careful with chatting, or it would have to be well moderated, because I think that could also create certain dynamics that are not necessarily beneficial when you ' re in a crisis situation." (Social worker, focus group 1)

It emerged from the discussions that there is no need for a tool to collect patient data.

"I would perhaps even explicitly exclude the recording of things like symptoms. I just remember – maybe that has changed in the meantime – when we were doing research, the adherence to doing it really conscientiously decreased extremely quickly." (Oncologist, focus group 1)

However, it would be desirable to guarantee access to patients' clinical documents to simplify exchanges with specialists and ensure that the patient's information is up to date.

Usefulness – What added value should the app generate?

Specific aspects relating to the practical benefits of an app were assigned to the category *usefulness*. The advantages and opportunities that can arise with the development of a digital application related to care for relatives were highlighted. From the statements of the participants, various subcategories were differentiated, as discussed below.

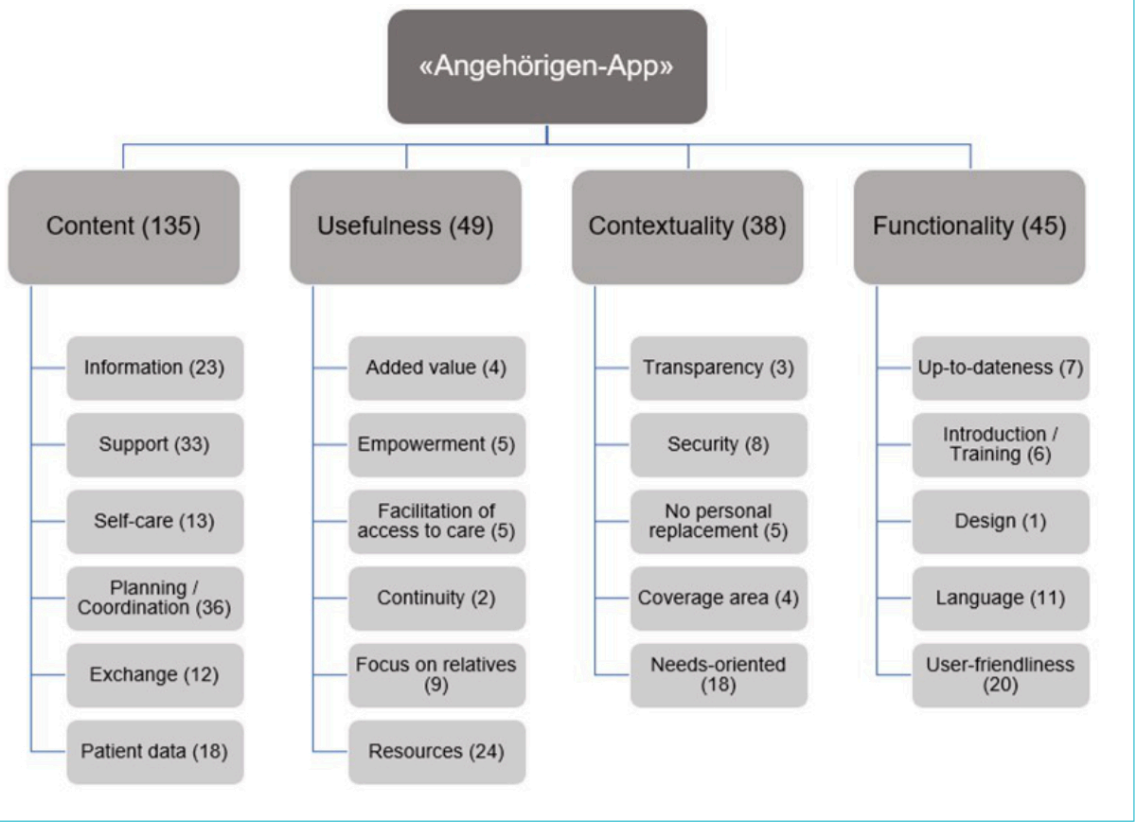
There was a clear consensus among the participants that there must be some fundamental added value from the app for it to be used. The app should not simply serve to reproduce or replace something that already exists on the internet.

"All in all, there simply has to be some added value for me to use it. So basically, why do I need an app?" (Medical IT specialist, focus group 2)

The fact that digital applications increase the opportunity for self-determination and autonomy of those affected was also emphasised. On the one hand, this includes indicating all available options as the basis for self-determined action. On the other, it was mentioned that an app can greatly increase accessibility to support. These two points promote autonomy by reducing dependence on other people and office hours.

"For me, it ' s that you always have access, day and night. […] That ' s the accessibility, that ' s the biggest advan-

Figure 1: Category system "Angehörigen-App". The simplified category system developed from the statements of the focus groups, with the four main categories and corresponding subcategories. The number of text passages in which the categories were mentioned is written in brackets. Not shown in this figure is a residual category containing 20 irrelevant text passages.



tage of digitalisation for me. " (Social worker, focus group 3)

Facilitating access to care through an app was also mentioned as a benefit by participants. In this context, the primary barriers to care were identified as living in rural areas and problems arising from different cantonal regulations. Digital applications could simplify access, particularly for people living in rural areas.

"I also think [...] that relatives are often not given enough support, especially when it comes to non-urban regions. We still have a lot of people who come from far away, from small villages, and then we would have more opportunities to support them there." (Music therapist, focus group 3)

The desire for continuity over the course of a patient's illness emerged as a further need from the group discussions. Ideally, the affected people, both patients and their relatives, would experience a certain stability in their care. For example, this could mean having one main contact person throughout the course of the illness. Continuity requires many diverse resources, and digital applications could provide support in this regard.

"There are care advisors who are always in contact with the patients, from the diagnosis to the end. I think it should go in this direction, and this could also be on a digital level, it doesn ' t matter. Continuity is certainly an important point. "(Registered nurse, focus group 1)

The discussions highlighted the importance of emphasising the significance of relatives and ensuring a greater focus on them. The statements made clear that cancer care is strongly centred on the patient and that relatives are often neglected. As the name suggests, the development of an app for relatives should be made deliberately for relatives and primarily cover their needs. For this reason, the importance of involving relatives in the development was emphasised.

" And that we are visible as relatives. I don ' t know how it feels for you [a relative is addressed], but it takes a very long time before relatives are asked how they are doing." (Nurse with additional expertise and relative, focus group 2)

In one of the subcategories on usefulness, various aspects were discussed relating to resource scarcity and resource promotion through digital applications. The core statements of the professionals emphasised their experience that time is a very limited resource in care. Meanwhile, relatives mentioned that every opportunity to save time in the treatment situation is a gain in quality of life. However, financial resources often limit the extent to which palliative care is tailored to the needs of those affected. An app could enable financial savings in certain areas, for example, through improved coordination. An app could also reduce stress by making certain tasks easier. However, it is important that constant digital availability does not result in even more care tasks falling on relatives. In the discussions, the importance of improving the quality of life was explicitly emphasised by relatives.

"I believe that living life, apart from everything else, is the most important thing you can still have." (Relative, focus group 1)

Contextuality – How should the app be structurally embedded and organised?

Participants discussed the structural embedding and organisation of the app. The topics mentioned in this regard were summarised in the category *contextuality.*

The topic of security was mentioned by the participants. Data protection was mentioned as a fundamental concern in all focus groups, and was highlighted as one of the greatest challenges of digitalisation. The integration of data and documents from patients and controlling access to them could be particularly problematic.

The category of transparency was relevant for some participants. In this regard, the importance of a trustworthy provider and the transparent presentation of sources was mentioned. In addition, reliable sources for the content should be guaranteed. This would promote trust in the application and its use.

" I also see added value when the provider of such an app is someone who has a certain level of trust. Especially on the internet, it ' s very important to have reliable sources that you can recommend." (Medical IT specialist, focus group 1)

The participants also emphasised that support from a digital application is only desirable if the intention behind it is not to replace specialists and leave those affected with only digital solutions. An app should be used as a supplementary means to contact professionals, and the support of a person behind the given information should be guaranteed.

" And also what you said before, that it cannot replace personal contact. It should be a supplement, an additional security, provide additional security and give additional input, but not replace a specialist." (Registered nurse, focus group 2)

The geographical area that the provided information should cover was also discussed. The participants agreed that the app should cover a limited area and not be intended for global use. An exact definition of the boundaries was not mentioned, but an area of use limited to Switzerland was certainly considered desirable.

" And I think it really has to be local and specific. It has to be either be Swiss or German, or something local and culturally coherent. Because otherwise it ' s difficult. "(Oncologist, focus group 1)

Another relevant point of discussion was the structure of the app. The app should be developed according to a modular structure appropriate to the various needs of the relatives. A needs-oriented selection is important because while relatives can take on different roles in patients' care, they also have different needs of their own. These needs may depend on the relationship between the relative and the patient and the relative's age, as children and adolescents may also be affected and would have different needs. On the other hand, the needs also depend on the situational conditions, such as the stage of the patient's illness.

"Perhaps also divided into different roles, e.g. grandparents, children, or adults; very close caregivers or spouses. You could divide them up according to who is affected by what. I think the needs of these groups are different." (Psycho-oncologist, focus group 2)

The topic of separating content between relatives and the patient was also discussed. It emerged that the question of clear separation must be addressed before an app is developed. The tendency of the participants' statements was strongly in the direction of a modular division. It should also be taken into account that relatives should be able to choose for themselves which modules would be suitable for them.

Functionality – What functional and technical features should the app contain?

It was possible to define the main category *functionality,* which covers aspects that deal with the functional and technical features of the app. The various subcategories that emerged from the participants' discussions on the topic of functionality are explained below.

The support and maintenance of the app after its launch were emphasised as important aspects. Continuous further development and updating of the app were mentioned as absolutely essential. Participant statements refer to the content itself, which should not contain any outdated information, while also highlighting the importance of ensuring technical support and continuous development of the application.

" It should certainly also be up to date. If you say you want to network with advisory services or local networks, then it shouldn ' t be outdated so that you can ' t find information that is no longer valid. " (Social worker, focus group 1)

Participants also mentioned the need for expert introductory training on how to use the app. The lack of initial training could lead to potential users being lost as they feel overwhelmed by the app and consequently stop using it.

One exclusion criterion mentioned was the potential unappealing design of the app.

" If it looked ugly. If it were an ugly app " (Psycho-oncologist, focus group 2)

Otherwise, the visual design of the app was not discussed in detail.

Great importance was attached to the topic of language. The subjects of multilingualism and simplified language were both discussed. Due to the different national languages, and the different countries of origin of those affected, the importance of language selection was emphasised. On one hand, this relates to the language settings of the app itself, but should also be ensured at the content level whenever possible.

" And if the information is now available in German, then it ' s no problem to make it available in French, Albanian or other languages. " (Psycho-oncologist, focus group 1)

Simplified language is primarily about considering the various circumstances which can make complex language more difficult to understand. The content should be offered in simplified language so that people with cognitive impairments, for example, can also make optimum use of it.

"Ah yes, that reminds me of the whole concept of ' simplified language ' . We haven ' t thought about it yet. Especially for sick people with cognitive problems." (Music therapist, focus group 3)

An important aspect in terms of functionality is the user-friendliness of the app. Complexity should be avoided so that the app is not overloaded with content and information and is kept simple.

"It can also be too complicated. We have suggested many things. I think it will be difficult to make something simple out of it." (Resident, focus group 3)

In addition, participants discussed the need for options for functional customisation. This relates to aspects of the settings, such as font size, and also for using the app on different end devices.

"And I ' m thinking of the people who are already of a certain age. It would also be good if the font can be a certain size." (Social worker, focus group 3)

The app should function in such a way that no mandatory information needs to be filled in for it to be used. The participants expressed their disapproval of apps that can only be used if, for example, several questions have been answered first. They pointed out that advertising, mandatory newsletters, and constant requests to use the app should be avoided.

"So that there is not a newsletter that is offered or that is mandatory. I understand if someone says: No, I don ' t want to." (Music therapist, focus group 3)

Differences between language regions

Finally, the participants discussed the differences between the language regions and how these should be addressed in the development of the app. The participants mainly referred to the problems that could arise due to the different languages and cultures of the regions. These include, for example, the difficulty of adequately treating German-speaking patients in French-speaking care facilities and vice versa, resulting from a lack of bilingual staff. It was also mentioned that coordination between facilities in the different language regions is not always optimal.

"And I have to say that I also find it scandalous, but really scandalous, that we have too few resources, for example in translation." (Nurse with additional expertise, focus group 3)

Discussion

Main findings

This study served as a needs analysis and the basis for the development of content and structure of a mobile support app for family caregivers of patients with advanced life-limiting cancer. The analysis of the statements from the focus groups led to the identification of four main categories with corresponding subcategories. The main categories covered the topics of content elements, general usefulness, structural embedding, and functionality of the app.

Need and usefulness

According to the participants, relatives are often neglected in the treatment process. From the discussions, it emerged that there is a general need for an app to provide psychological support for the relatives of people with life-limiting cancer in Switzerland. This is in line with the report by Given et al. [10], which states the importance of support measures for relatives to reduce various stress factors.

In the development of an app for family caregivers, specifically taking their needs into account was seen as a possible measure. According to participants, several barriers that make it difficult to provide optimal care must be considered. A lack of care services, disadvantages for patients with limited financial resources [11], and a lack of time for professionals [9] were key factors mentioned. The intended app can be seen as a low-threshold service that can provide support, for example, during the bridging period between diagnosis and the initiation of the treatment. Increased efficiency through digital applications is accompanied by both time savings for professionals and a reduction in costs for service providers, which in turn could have positive long-term effects in terms of cost reduction for service users [27]. In addition, the gap in care is particularly noticeable in rural areas [11], which was also mentioned by participants. However, they immediately emphasised the potential of digital applications to counteract these effects in undersupplied rural regions.

The participants also emphasised that an app can help promote autonomy and ensure constant access to services. One study showed that relatives who received app-based empowerment support had lower stress scores on the Distress Thermometer than those in the control group [28], reinforcing our participants' statements. The results of the aforementioned study also showed that empowerment support was associated with higher scores in terms of quality of life. The aspects of reducing stress and increasing quality of life were mentioned by the participants as an advantage of digital support apps.

Content elements

In terms of the content requirements of the app, a number of aspects were mentioned by participants. One important aspect concerned the provision of information, which should be bundled and clearly presented. Given the enormous amount of information available, it can be challenging to select and provide relevant information. Therefore, it will be important to ensure well-founded and up-to-date information, especially on legal and financial aspects, to reduce any additional burden for relatives [29].

The need for increased support for relatives by healthcare professionals has been previously recognised and should be urgently promoted [10]. As mentioned by participants, support is necessary throughout the course of the illness and should include rapid availability and professional assistance in emergencies. For example, the app should ensure that rapid personal contact is guaranteed when necessary. An emergency button could offer the concrete possibility of assistance. It remains to be defined whether the contact would be a single triaging professional or several contacts would be available for specific topics. It should be possible to make an emergency call 24/7 through the app to initiate support within a very short time. However, the service behind this emergency button still needs to be clarified.

Coordinating appointments with third parties is one of the other tasks that can place an extra burden on relatives, in addition to caring for the person with cancer [30]. If such additional administrative tasks could be simplified using an app, it would relieve the burden of planning on relatives. It was mentioned that coordination between parties could be optimised using digital applications, both between caretakers and professionals and within care teams. In this respect, digitalisation offers opportunities to make internal communication more efficient, which also saves time and reduces costs [27].

According to participants, the inclusion of detailed psychosocial interventions, such as relaxation exercises – or at least a link to relevant information – should be considered. The app should also contain suggestions that are not necessarily intervention-based. The effectiveness of various eHealth interventions for relatives has already been proven, including increases in quality of life measurements and a reduction in depressive symptoms in family caregivers [31]. These findings support the integration of interventions into the app, although these must be scientifically based and tailored to the individual.

When integrating content elements, two aspects were discussed critically with some controversy. One aspect was personal exchanges between those affected. If a chat or forum function is provided for personal exchanges, it must be ensured that valid information is provided in a professional manner. Although support groups are less important as a source of information for relatives than for patients and are less important than the internet in terms of information access [32], it has been indicated that internet support groups have positive effects on social support and self-efficacy of family caregivers [33]. This need should be investigated further.

Another critical aspect was the specific collection of patient data using an app. One study reported positive correlations between electronic symptom recording by patients and their treatment outcomes [34]. The participants' scepticism is nevertheless justified, as the app would be aimed towards relatives and the patients; data collection could mean additional effort on the part of caregivers. However, the integration of existing relevant documents could be considered, as this would facilitate communication between professionals and family caregivers, provided these documents are up to date.

Functionality and contextuality

The participants also addressed the question of the functionality and structural embedding of the app. In terms of functionality, the aim would be to achieve a high level of user acceptance. The participants considered it essential that the app is not complex and is kept as simple as possible. Wang and Qi [35] summarise that the simplicity of an app and user acceptance are related. In terms of user-friendliness, the need for modifiable functional settings, such as font size, was also mentioned by the participants. This is in line with the usability quality principle of the eHealth Suisse criteria catalogue for self-declaration of the quality of health apps, which states that an app should be functionally customisable for specific target groups [22]. The eHealth Suisse criteria catalogue also emphasises the importance of ensuring apps are technically up to date, a requirement also mentioned by the participants. This includes the transparent, comprehensible, and traceable presentation of sources and information. Furthermore, the use of a reputable publisher within the app was discussed as a central aspect of the "transparency" quality principle.

Data protection was mentioned by the participants as one of the main concerns regarding the use of digital applications. In a study by Kessel et al. [36] on the use of app-assisted cancer care, data protection was named as one of the most important issues needing consideration. The relevance of taking data protection into account in the development of the app was further increased by the revision of the Federal Act on Data Protection in Switzerland, which has been in force since September 2023. The new Federal Act stipulates that necessary data protection and processing principles, such as ensuring the highest level of security when introducing a product, must already be taken into account in the planning and development of any digital application [37].

A fundamental question for participants was whether the app should be designed for relatives more generally, or specifically those in a caregiving role. The participants indicated that both aspects could be integrated. However, these should be modularly separated, and the decision to access different modules should lie with the user. The app should also take personal and situational needs into account. For example, a modular selection should make it possible for a user to choose relevant information depending on whether they are a caregiver, or on the patient's stage of illness. In addition, the varying needs of different users should be considered in terms of their role in relation to the patient, as the stresses and concerns of relatives with different roles are diverse [38]. The supportive value of an app as an addition to the care structure was emphasised in all focus groups. However, it is imperative to avoid giving family carers the feeling that the app is replacing personal support from healthcare professionals.

Implications regarding language regions

The inclusion of different language regions in the development of the app was an asset in this study, because of the regional differences in the Swiss healthcare system [39]. The statements from the focus groups mainly referred to problems that arise due to the different languages spoken. When developing the app, it will therefore be important to cover the linguistic diversity of Switzerland. In terms of its functionality, the possibility of using the app in different languages is part of this, but regional linguistic integration should go further. The content, such as region-specific information or links, should be specifically tailored so that the app is useful throughout Switzerland. The importance of coordination between care facilities was also mentioned, especially when it comes to facilities across different language regions. In this regard, the development of the app should target comprehensive integration in oncological care facilities across Switzerland to increase the efficiency of coordination on an interregional level.

Limitations

The generalisability of our findings is limited for various reasons. We did not achieve the planned number of participants due to last-minute withdrawals. In addition, the target of two patient relatives per focus group could not be achieved. It should also be noted that 10 of the 15 participants, regardless of their mother tongue, were employees of Inselspital Bern. However, the participants in the French-speaking focus group were able to draw on their experience of previous employment in French-speaking regions. Additional interviews in French-speaking regions of Switzerland could add insights into regional differences.

The fundamental problem of the adequate transferability of classical quality criteria to qualitative content analysis posed a methodological challenge [40]. However, the use of the classic quality criteria in qualitative research has been criticised. Other quality criteria, such as transparency or intersubjectivity, are more relevant when conducting qualitative research [41, 42] and were therefore taken into account in this study. Nevertheless, the lack of resources for implementing the recommended reliability provisions in content analyses [24, 40] remained a challenge. Intercoder reliability was not applicable for resource-related reasons; nonetheless, the creation and revision of the category system took place in close consultation with the project leader.

Conclusion

The outcomes of this analysis indicate that there is a need for an app for the relatives of patients with incurable cancer in Switzerland. Reducing the known barriers to care [11] and an increased focus on relatives are two key aspects that should be achieved with an app. Digital applications have the potential to increase the empowerment of relatives and strengthen their use of resources. Relevant structural, functional, and content-related needs for achieving the objectives were also identified. The potential "Angehörigen-App" should be developed in structured modules, whose use can be adapted depending on the needs of the relatives, increasing its effectiveness [31]. The development of the app should take place under consideration of quality criteria, which include the topics of transparency, data security, and various functional requirements [22]. Furthermore, the future app should appeal to users from all over Switzerland due to its simplicity. A relevant added value of the app should be to provide content that is tailored to the Swiss healthcare system and takes regional circumstances into account. The content should consist of diverse but bundled information, support and coordination tools, data storage options, and self-care options. The aim of the app is not to replace personal contacts with healthcare providers, but to offer additional support for relatives during the illness of their loved ones.

Statement on data availability

To protect the privacy of the participants, the data that support the findings of this study are available from the corresponding author, AW, upon reasonable request.

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Potential competing interests
All authors have completed and submitted the International Committee of Medical Journal Editors form for disclosure of potential conflicts of

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