



## A tailored mindfulness-based program for resident physicians: A qualitative study

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### ABSTRACT

**Background:** Diminished well-being is prevalent in resident physicians. This qualitative study explored the effects of a tailored mindfulness-based program (MBP) aimed at increasing resident physicians' well-being. A second goal was to compare the MBP with an active control group.

**Materials and methods:** We conducted interviews with 35 resident physicians: 21 physicians attended an eight-week MBP (intervention group) and 14 physicians received text-based information about mindfulness for self-study (control group). The interviews were analyzed using thematic analysis.

**Results:** Participants in the intervention group reported that the MBP helped them integrate mindfulness into their everyday life, increased their self-awareness, equanimity and well-being, and had positive effects on their self-care and interactions with patients. In the control group, the perceived effects were minor.

**Conclusion:** A tailored mindfulness-based program can help resident physicians care for their own well-being during medical residency and can have positive effects on their interactions with patients.

### 1. Introduction

Medical residency is a demanding period characterized by long working hours, high workload, great responsibility combined with a low level of control and reward, and scarcity of supervision [1–3]. These work stressors make resident physicians vulnerable to diminished well-being [2,3]. Accordingly, several large-scale studies report rates of burnout between 21% and 60% [4–6], rates of depression between 22% and 51% [4,7], and a rate of anxiety of approximately 30% [7]. In a study comparing resident physicians to a general population with a similar age and educational level, burnout and depression were more prevalent in resident physicians (50% compared to 31% for burnout and 50% compared to 41% for depression) [4]. Similarly, life satisfaction was found to be lower among resident physicians compared to the general population, with 36.7% of resident physicians reporting being satisfied with life compared to 55.9% of the general population [8]. In addition to personal impairments, poor mental health in resident physicians is associated with suboptimal patient care [9] and increased treatment errors [10]. Consequently, it is increasingly acknowledged that physicians' well-being and self-care are important for medical

professionalism and a requirement for delivering high-quality patient care [11–15]. In contrast, the culture of medicine and medical training promotes self-neglecting attitudes, such as viewing paying attention to personal needs as a weakness, prioritizing professional accomplishments over personal needs, and promoting the image that physicians are never ill [16,17]. These attitudes may interfere with physicians' ability to take care of their own well-being [16]. Therefore, there is a need for programs that address resident physicians' well-being.

A promising approach is programs that promote mindfulness. Mindfulness is a state of awareness that can be defined as present-moment awareness that is accompanied by a nonjudgmental and open attitude [18]. A growing body of literature demonstrates the beneficial effects of mindfulness-based programs (MBPs) on well-being in physicians, including reduced perceived stress, depression, anxiety, and burnout as well as increased satisfaction with life [19]. Research on MBPs for resident physicians is scarce. Preliminary studies are promising, but inconclusive regarding their effectiveness. Some studies report positive effects of an MBP on stress or burnout [20,21], whereas others do not find such effects [22,23]. Similarly, some studies report positive effects on mindfulness [20,23], although others do not [22]. There are

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potential hindrances that challenge the effectiveness of MBPs during medical residency. First, resident physicians who participated in a smartphone-based MBP named lack of time to engage in formal mindfulness practice as the most important barrier [24]. Second, a review of MBPs for physicians described integrating mindfulness practices into work life as challenging [19]. Supporting this notion, several studies have concluded that MBPs might be more effective if they focus on the transference of mindfulness skills from the classroom to work at the hospital [20,25]. Third, within the context of medical culture that promotes self-sacrificing attitudes and a performance orientation [16,17], an MBP may function as a means of increasing stress tolerance and performance. Therefore, it may not be as effective at increasing well-being. In sum, most MBPs neglect the context of medical residency, challenge of integrating mindfulness into work at the hospital, and time constraints preventing mindfulness practice. Consequently, there is a need for MBPs that are tailored to resident physicians' needs.

Within the present study, we investigated an MBP that has been specifically tailored to resident physicians' needs with a focus on the transference of mindfulness practice into daily work at the hospital and with the overall aim of increasing resident physicians' well-being.

Most studies investigated MBPs for physicians and resident physicians using standardized questionnaires [21,22,26]. However, these studies do not provide insight into participants' experiences in the MBP, which aspects of an MBP are perceived to be helpful and which are not, how mindfulness is integrated in private and work life, and what ways participating in an MBP is perceived to affect physicians' well-being as well as their private and work life. Therefore, the primary goal of this qualitative study was to explore participants' experiences in and perceived effects of the tailored MBP.

A secondary goal was to qualitatively explore the effects of a control group that included text-based learning and compare the resulting themes and structures between the intervention and control groups. Finding adequate active control groups is a major concern in research on MBPs [e.g. 27]. One approach is to design interventions that match the MBP in nonspecific elements while not including mindfulness, such as health enhancement programs [27], relaxation trainings [e.g. 28] or music trainings [29]. However, this type of control group neglects the effect of participants' expectations regarding the effectiveness of mindfulness [e.g. 30]. In contrast, a control group that receives a course book on mindfulness for self-study takes this aspect into account and, thus, may provide a more adequate control condition for MBPs. Text-based learning (i.e., learning from description) and learning from experience (i.e., the focus of the MBP) are two distinct ways of learning [31]. Learning from experience refers to the process of living through events, and the acquisition of skills is the result of repeated experiences. In contrast, learning from description means third-person experience and knowledge that is shared through externalized symbolic representations, such as written or oral language [31]. This distinction is relevant in the context of acquiring skills in mindfulness because it has been proposed that mindfulness is a state that is experiential and cannot be accessed by language entirely [32]. In other words, to fully understand mindfulness one needs to engage in mindfulness practice and gain first person experience in introspective, nonjudgmental present moment awareness. Furthermore, this experience of mindfulness cannot be conveyed through written or oral language completely [32]. Consequently, we assume that the intervention group who receives the MBP with a focus on learning from first person experience would benefit more than the control group who learns from description. Accordingly, our goal was to qualitatively explore and compare the perceived effects of those two groups.

## 2. Materials and methods

### 2.1. Study design

We conducted a qualitative interview study as part of a larger

randomized controlled trial (RCT). A detailed description of the RCT can be found elsewhere [33,34].

### 2.2. Participants

Theoretical sampling was not possible because the study was conducted in an anonymized fashion; hence, we did not keep a list to link the names of participants to their identifying code and data. However, we continuously monitored the interviews and invited participants until the subsample of resident physicians who took part in the interviews covered a range of typical attributes, as would be expected in theoretical sampling, including age, sex, specialty, and level of burnout at baseline. At the same time, we monitored the saturation of topics [e.g. 35] and invited participants until no new information was obtained. Saturation and coverage of baseline characteristics were reached.

### 2.3. Intervention

A detailed description of the intervention, including an outline of program topics, has been provided elsewhere [33,34]. In the following section, we will give a brief overview of the intervention.

#### 2.3.1. Intervention group

Resident physicians assigned to the intervention group took part in an eight-week mindfulness program consisting of weekly sessions of 2.5 h each and one full-day silent retreat. The mindfulness program is based on Mindfulness Based Stress Reduction (MBSR) developed by John Kabat-Zinn [36] and has been specifically tailored to resident physicians' needs. (1) To promote resident physicians' well-being, mindfulness was supplemented by a focus on *Muße*. The term *Muße* is a word in the German language, but there is no one-to-one truthful translation into English. It refers to a state of mind in which individuals feel free of pressure, especially time pressure and the pressure to perform [37]. It is a state of equanimity and fulfillment in which one feels at ease and content. By focusing on *Muße* as a state, the aim of the MBP is to create an anti-pole to stress and functioning and to promote mindfulness as a practice of self-care. (2) The MBP has an emphasis on informal mindfulness practices by enabling participants to experience states of mindfulness during everyday life (i.e., feeling one's feet while walking along the hospital hallway or bringing one's awareness to the present moment while disinfecting one's hands). (3) Resident-specific topics were included, such as dealing with the stressors of residency or mindful communication with patients. (4) Additional information and the scientific background of program elements were included.

#### 2.3.2. Control group

Resident physicians assigned to the control group received a course book on mindfulness containing the same written material about mindfulness practice that participants in the intervention group received. The course book consisted of detailed descriptions and definitions of mindfulness, studies on mindfulness, the relationship between mindfulness and stress, acceptance, and self-care, and meaning in medicine. In addition, the course book contained inspiring stories and poems about mindfulness, but no hands-on exercises. The eight chapters in the course book were sent to participants by e-mail on a weekly basis. By this means, the control condition matched the temporal structure of the MBP the intervention group received (i.e., eight weekly course sessions).

### 2.4. Data collection

Participants were interviewed individually at the Medical Center of the University of Freiburg, Germany between one and six months after completion of the program. The interviews followed a semi-structured guide that was developed following the four steps of the SPSS procedure suggested by Helfferich [38]. The first step comprised a

brainstorming process to generate questions. To ensure coverage of a wide range of themes and reduce personal biases in generating questions [38], this process was done independently by four individuals with different backgrounds. Two persons had broad knowledge of the mindfulness literature, one person was experienced in mindfulness meditation, and one person was naïve to both mindfulness practice and the literature on mindfulness. In the second step, the questions were reviewed for their suitability. In the third step, the questions were grouped into themes. In the fourth step, the interview guide was organized into key questions that introduced a topic and invited the interviewee to talk freely, followed by more specific questions [38]. These topics included (1) general motivation for participating in a mindfulness program, (2) how resident physicians experienced the program/reading material, (3) perceived effects of the program/reading material, including specific questions on the perceived effects on their general attitude, thinking, behavior, self-care, work life and leisure time, and (4) aspects of the program/reading material they found beneficial/not beneficial. The interviewer was allowed to use the order of the questions in a flexible manner to facilitate the flow of the interview. Moreover, the interviewer was free to ask further questions about topics that came up during the interview spontaneously [38]. This allowed for exploring effects of the intervention that went beyond the themes addressed in the interview guide. However, to ensure comparability between the interviews, we adhered to the questions in the interview guide to a large degree. The interviews were conducted in German, and the quotes presented in the following section were translated into English and reviewed by a native speaker. The interviews were audio recorded and lasted between 15 and 60 min. The audio recordings were transcribed by applying the transcription rules presented by Dresing and Pehl [39]. These rules comprise a verbatim transcription, a translation of dialectic and colloquial words into German, documentation of nonverbal content, and a shortening of nonfluent speech, including stuttering and unfinished words, to form more coherent sentences. All data were anonymized.

### 2.5. Data analysis

Data were evaluated using the six steps of thematic analysis by Braun and Clarke [40]. The first step involved familiarization with the material to gain an understanding of the scope and depth of the interviews. In the second step, initial codes were assigned by identifying meaningful content within the interviews. In the third step, the codes were summarized into overarching themes. The fourth step involved reassessing whether the themes adequately represented the coded segments and the data as a whole. In the fifth step, the identified themes were named and defined. In the sixth step, the results were written down. Data transcription, processing and analysis were conducted using MAXQDA software [41].

### 2.6. Methodological rigor and trustworthiness of data

We established the four criteria of trustworthiness of qualitative data by Lincoln and Guba [42], including credibility, transferability, dependability and confirmability within this study.

Credibility is the analogue to internal validity in quantitative research and refers to the believability and confidence in the truth of the data and its' interpretation [42,43]. To establish credibility we used both analyst triangulation and data triangulation. Analyst triangulation was used to ensure intersubjective stability of the results and involved the independent analysis of the data by three researchers, followed by a comparison of the analysis. For the purpose of data triangulation, an open-ended question about the experienced effects of the study was included in the questionnaire that was given to all 147 participants four months after completion of the mindfulness program/self-study of the course book. No additional themes emerged from these written answers.

Transferability is the analogue to external validity and refers to the

extent to which the results can be generalized [42,43]. Specifically, this refers to the judgment made by the reader who may wish to transfer the results to other settings. To facilitate such a judgment of transferability, we provided detailed descriptions of the participants, the intervention, and the research process (i.e., 'thick descriptive data' [42]).

Dependability is the analogue to reliability and means that the results of the qualitative study are repeatable. Confirmability is the analogue to objectivity and means that the results are not biased by the researcher [42,43]. To establish dependability and confirmability, it is essential to transparently describe the entire research process [43]. To this end, we adhered to a detailed study protocol, which had been pre-registered [trial registration number DRKS00014015] and published [33] and documented the process of developing the study, data collection and analysis in detail.

## 3. Results

### 3.1. Study sample

A total of 147 resident physicians from a wide range of medical disciplines participated in the RCT between September 2018 and May 2020. Participants in the first three cohorts (i.e., 77 resident physicians) were invited to take part in an interview. Of the invitees, five declined, 37 did not respond, and 35 agreed to take part in the interview. The final sample consisted of 21 resident physicians in the intervention group and 14 in the control group.

Table 1 gives an overview of the characteristics of the interviewees at baseline. There were no differences in terms of age, gender, relationship status, year of tenure, or level of burnout between resident physicians who participated in the interviews and those who declined to participate or did not respond.

### 3.2. Intervention group

Interviews with participants in the intervention group resulted in six themes: (1) implementation of mindfulness into everyday life, (2) awareness, (3) equanimity, (4) positivity, (5) self-care, and (6) social interaction. In addition to these themes, contextual factors were described that influenced the effects of the MBP. It is important to note that the extent of the reported effects differed considerably across participants. Some participants reported a profound impact of the MBP, whereas other participants perceived almost no effects of the program.

#### 3.2.1. Implementation of mindfulness into everyday life

The first theme was the implementation of the practices learned during the eight-week program and establishment of one's own mindfulness practices as part of everyday life. Many resident physicians described engaging in formal mindfulness practices, such as sitting

**Table 1**  
Characteristics of participants at baseline.

	Intervention group (n = 21)	Control group (n = 14 <sup>a</sup> )
Mean age, years (SD)	30.7 (2.3)	30.7 (2.1)
Female sex, n (%)	14 (66.7)	9 (69.2)
In a relationship, n (%)	14 (66.7)	9 (69.2)
One or more children, n (%)	2 (9.5)	3 (23.1)
Tenure in training, years (SD)	3.3 (1.8)	3.4 (1.5)
Burnout <sup>b</sup>	48.8 (20.3)	49.7 (15.5)

Note. n = number; SD = standard deviation.

<sup>a</sup> The code of one participant in the control group was lost. Therefore, we were unable to retrieve the demographics of that person and, hence, the demographics within this column are based on 13 participants instead of 14.

<sup>b</sup> Personal burnout subscale of the Copenhagen Burnout Inventory [44]. The maximum score is 100.

meditation or body scans, and almost all the resident physicians mentioned practicing informal mindfulness exercises. Notably, the majority of the interviewees reported that they practiced informal mindfulness techniques, whereas formal practice was less frequent. Furthermore, the resident physicians stated that they were able to integrate those informal practices into their work life, such as mindful walking along the clinic corridor, pausing for a moment before continuing their work, mindful eating, or taking a few conscious breaths while disinfecting their hands.

Most participants reported that they had trouble implementing mindfulness. Many of them indicated that it was difficult to find time to practice formal meditation at home, and some mentioned difficulties in implementing informal exercises at work. Furthermore, some participants reported difficulties in sustaining the practice of mindfulness after the end of the eight-week program.

*'And to take out some moments for yourself to be mindful. I believe that this is the main thing that I apply to myself – also at work [ ... ] Infrequently, I practice the body scan in the evening to help me fall asleep.'* (Interview ig9)

*'It is always a problem of time .... After having been at work for eleven hours and getting home, you still have to do this or that thing, and at ten, I am so tired that I usually just fall into bed. It's a shame, really.'* (Interview ig20)

### 3.2.2. Awareness

The second theme was increased awareness. Participants mentioned that the MBP helped them to be less engaged in thoughts about the past or the future and instead be focused on the situation or activity at hand.

Moreover, participants reported that they were generally more aware of their own emotions, thoughts, and bodily sensations. Moreover, many participants stated that they had become more aware of experiencing stress, and some mentioned that this made them feel more at ease.

*'really being present in the moment and not being in that room already, which is still one hundred meters away.'* (Interview ig18)

*'One is more aware when one is starting to feel stressed. This is something that I did not use to notice.'* (Interview ig10)

### 3.2.3. Equanimity

The third theme that was reported by the majority of participants was increased equanimity. Specifically, they mentioned being better able to gain distance from and to dis-identify with thoughts, emotions, and stressful situations and to reduce ruminative thinking about work during their leisure time. At the same time, participants described being more accepting of situations that were beyond their control. Moreover, many of the resident physicians expressed feeling calmer and more relaxed.

Furthermore, some participants expressed that they were more often able to recognize that stress is a subjective experience that is influenced by their personal interpretation of a situation. This realization helped them meet perceived stress with greater calmness and equanimity.

*'I have the feeling that, overall, I have become a bit calmer .... It seems that I keep calm easier than I used to.'* (Interview ig2)

*'I think it is a big achievement to take a step back, and that is often already enough to notice that it is just an emotion or a feeling of being stressed'* (Interview ig3)

### 3.2.4. Positivity

The fourth theme was a positive impact of the program on resident physicians' positivity. Many of the resident physicians described feeling

more positive or content in general and stated that they were better able to focus on the positive things in their everyday life. Some described being able to enjoy the moment more effectively. Moreover, some resident physicians mentioned a more positive attitude and increased satisfaction with life or their job.

*'I believe that, overall, I'm happier, despite living through a difficult time.'* (Interview ig15)

*'Indeed, I have the feeling that I am more satisfied when going to work and when going home.'* (Interview ig17)

### 3.2.5. Self-care

The fifth theme was a positive effect of the MBP on the resident physicians' self-care, including the effects on participants' attitudes towards themselves and their behavior. Most participants mentioned having developed a friendlier, more compassionate and accepting attitude towards themselves. Some of them mentioned an increased awareness of and reduction in self-directed judgmental thoughts and perfectionism, and some participants indicated that their inner monologue towards themselves had become kinder in tone.

Furthermore, most participants reported an increase in self-care behavior, including placing their personal needs as a higher priority and attending to their physical needs more often during stressful workdays, such as taking time to eat, taking a sip of water, or going to the bathroom. Furthermore, some of the resident physicians stated that they were better able to respect their own limits by saying 'no' more often or staying home when they felt sick.

Some resident physicians reported an increased awareness of what was meaningful to them as well as a change in their priorities. Specifically, some participants described rethinking what was important to them and what they wanted to prioritize in life.

*'That the course has helped to appreciate oneself and be friendlier towards oneself.'* (Interview ig12)

*'I believe that I pay more attention to what is good for me, and that I also reserve times and spaces for myself ... where I say this is mine, and I need it to do something good for myself.'* (Interview ig2)

*'The longer you stay at it [mindfulness practice], the more you draw conclusions for yourself, about how you want to lead your life.'* (Interview ig9)

### 3.2.6. Social interaction

The sixth theme was the effects on the resident physicians' social interactions. Participants described various effects on their interacting with others both at work and during leisure time. For instance, the resident physicians mentioned being better able to take time for their patients as well as to listen to and be genuinely interested in their stories. At the same time, they indicated that they experienced this as rewarding and that they had the impression that patients were more satisfied with the care they received. Similarly, they reported being better able to be present and attentive when being with friends while feeling less of a need for self-portrayal. Some participants described this as being a consequence of feeling more at peace with themselves.

*'And now I feel a bit more at peace with myself, and because of this, I can take more interest in other people .... That was the case both at home and when interacting with patients. One is faster in directing attention to the other person, and one is a bit more open and can show more interest in them because one is not as preoccupied with oneself.'* (Interview ig3)

*'[ ... ] and to contribute to patients' satisfaction through attention, good conversation, guidance and good care in general.'* (Interview ig9)

### 3.3. Contextual factors potentially influencing the effects of the MBP

In addition to the perceived effects of the MBP, participants described factors that may influence the effects of the MBP in context. These factors included attending the MBP with colleagues and prejudices against mindfulness.

#### 3.3.1. Attending the MBP with colleagues

Almost all resident physicians reported that they had experienced it as helpful and supportive to attend the MBP with fellow resident physicians. In particular, the realization that other resident physicians experienced the same stressors at work and were similarly burdened was described as an important and reassuring experience. Some of the resident physicians stated that this was the first time within their professional training that they were able to share their personal experience and difficulties at work with peers.

*‘What I really liked was the exchange with the others. I believe this is one of the things that helped me the most. Simply hearing what others experience ... and then you realize that you are not alone and that other people have the same thoughts as you.’ (Interview ig10)*

#### 3.3.2. Prejudices

Some of the resident physicians expressed prejudices against MBPs. One participant reported that he was initially worried that mindfulness was something esoteric that would not fit into his rational worldview. Another resident physician stated that he subscribed to a stereotype of mindfulness as only being something for those who had failed in their job. However, both resident physicians described that early in the program, they realized that their concerns were not warranted. Other resident physicians expressed their initial concern about being ridiculed by their peers for participating in an MBP. However, they expressed that their peers were positively interested in the MBP.

*‘When I hear mindfulness, I think of teachers with burnout who just reflect about themselves all day long and share their awesome experiences in the evening as if that’s something unworldly ... Which is nonsense because it [mindfulness] is part of everyday life’ (Interview ig8)*

### 3.4. Control group

Participants in the control group reported minor effects as a result of

reading the course book about mindfulness. Many of them reported that they experienced reading the materials as interesting and that it had inspired them and given them ‘food for thought’. Beyond that, many reported no effects or minor effects lasting a short duration. Analysis of the interviews resulted in five themes: (1) implementation of mindfulness into daily life, (2) equanimity, (3) self-care, (4) social interaction, and (5) reflection on the format and content of the reading material. Table 2 gives an overview of the main themes and of how they compare between the intervention group and the control group.

#### 3.4.1. Implementation of mindfulness into daily life

In the first theme, participants reported that they tried to implement what they read about mindfulness into their daily life but did not or only succeeded in doing so to a small extent. For instance, many participants described trying to be present in the moment more often but explained that these attempts proved to be difficult in most cases. Moreover, some of the resident physicians mentioned a positive effect of the reading material on their ability to reflect on their own behavior or thoughts. At the same time, some of them stated that this increased reflection made them feel exposed or made them blame themselves for feeling stressed or not being able to act differently.

*‘And every time I have resolved to do it – this is good input and I would like to implement it- but I have never made the jump .... I am trying to be in the moment a bit more. It takes a lot of effort on my part, because I really have to make myself aware of it. I succeed at doing so pretty rarely.’ (Interview cg5)*

*‘I sometimes blamed myself: Why do you experience things the way you do and why are you always in a rush?’ (Interview cg6)*

#### 3.4.2. Equanimity

The second theme addressed by participants in the control group was equanimity. Some of them reported that reading about mindfulness made them somewhat more equanimous and accepting towards experiencing stress and time pressure. A few participants also described minor improvements in not thinking about work during their leisure time and being able to step back from experiences at the clinic or distressing thoughts. Furthermore, some participants mentioned a short-lived effect of feeling relaxed and calm after reading about mindfulness.

*‘Sometimes, when I am under a lot of pressure and think about all the things I still have to do for the thousandth time – then I know that in that*

**Table 2**  
Comparison of themes between the intervention and control groups.

Theme	Intervention Group	Control Group
Implementation	<ul style="list-style-type: none"> <li>reports of formal and informal mindfulness practice with a focus on informal practices</li> <li>difficulties in implementing mindfulness, such as not having enough time</li> </ul>	<ul style="list-style-type: none"> <li>reports of not being able to implement mindfulness in daily life or only to a limited extent</li> </ul>
Awareness	<ul style="list-style-type: none"> <li>reports of increased awareness of thoughts, emotions, behavior and surroundings</li> </ul>	<ul style="list-style-type: none"> <li>perceived increased reflection on personal behavior and experience as part of trying to implement mindfulness into daily life</li> </ul>
Equanimity	<ul style="list-style-type: none"> <li>reports of a major impact on feeling more equanimous towards personal experiences</li> </ul>	<ul style="list-style-type: none"> <li>reports of minor effects on feeling more equanimous towards experiencing stress</li> </ul>
Positivity	<ul style="list-style-type: none"> <li>reports of feeling more positive or content in general</li> <li>reports of a more positive attitude towards the job</li> </ul>	–
Self-care	<ul style="list-style-type: none"> <li>perceived changes in attitudes towards self-care</li> <li>reports of positive impact on self-care</li> </ul>	<ul style="list-style-type: none"> <li>reports of changed attitudes towards self-care, but no effects on a behavioral level</li> </ul>
Well-being	<ul style="list-style-type: none"> <li>reports of feeling more content or positive in general</li> <li>perceived increase in job satisfaction</li> </ul>	<ul style="list-style-type: none"> <li>no reports on effects on well-being</li> </ul>
Social interaction	<ul style="list-style-type: none"> <li>perceived positive impact on being able to take time for and genuinely listen to patients</li> <li>perceived positive impact on patients’ satisfaction with the care they received</li> <li>reports of a positive impact on communication during leisure time</li> </ul>	<ul style="list-style-type: none"> <li>reports of small, but positive effects on communication with patients</li> </ul>
Other themes	<ul style="list-style-type: none"> <li>prejudices against mindfulness</li> <li>attending the course with colleagues perceived as helpful</li> </ul>	<ul style="list-style-type: none"> <li>criticism about delivering the mindfulness course book by e-mail</li> </ul>

*moment things will not be done faster if my thoughts keep ruminating. That might indeed be an effect of it [reading about mindfulness]' (Interview cg9)*

### 3.4.3. Self-care

The third theme was the effects of the reading material on the resident physicians' self-care. Many participants reported a change in their attitudes towards their own needs and self-care. They described it as helpful to read that taking care of ones' own needs is not a weakness, but legitimate and important. A few participants reported an increased awareness of their own needs or their self-compassion. At the same time, participants reported hardly any effect on actual self-care behavior.

*'I may be a bit more aware of the fact that it is ok to take care of oneself, however, I would not be able to give any concrete examples or describe situations in which I am doing something substantially differently.'* (Interview C8)

### 3.4.4. Social interaction

The fourth theme was the effects on the resident physicians' interactions with patients. Some of the resident physicians mentioned positive effects of reading the manual about mindfulness on their communication with patients. For instance, the resident physicians mentioned trying to be more empathic and understanding. Furthermore, they described taking more time when communicating with patients and focusing on the patient.

*'Well, it has given me food for thought concerning certain aspects of the patient, such as seeing things from the patients' perspective' (Interview cg11)*

*'When I'm with patients I take more time and I really try to be present in the moment during that conversation' (Interview cg4)*

### 3.4.5. Reflection on the format and content

In addition to the effects of reading the material on mindfulness, the resident physicians reflected on the format and the content of the course book. Many of them criticized the format of delivering the course book in weekly e-mails. Many participants mentioned that receiving the course book by e-mail did not motivate them to deeply engage with the material or that it had invited them to postpone opening and reading the material as just another work-related chore. Some of them suggested delivering such a course by podcast or in the form of short videos. Some participants criticized the individual lessons for being too long and indicated that they did not have the time to read it. Regarding the content of the course book, participants mentioned that they appreciated that it was tailored to resident physicians' needs and that it provided scientific information about mindfulness. Many participants described liking the stories about mindfulness. However, the majority of participants mentioned that they would have appreciated more hands-on examples.

*'Overall, receiving it [course book] by e-mail was not appealing enough to really engage with it. Well, I was interested and motivated. However, taking the time to really sit and read the material was too much of an obstacle.'* (Interview cg7)

## 4. Discussion

This qualitative study investigated the experiences of resident physicians who participated in a tailored MBP. Evaluation of the interview transcripts revealed six themes: implementation of mindfulness practice into daily life, awareness, equanimity, positivity, self-care, social interaction and contextual factors. These themes are interrelated. For instance, participants reported that increased awareness helped them

gain more distance from their thoughts and emotions and led to an increase in equanimity. Furthermore, increased awareness and equanimity were seen as factors leading to more well-being. Moreover, increased self-awareness and self-kindness were linked to being better able to respect their own needs, which again contributed to their well-being. At the same time, increased self-awareness and self-kindness were linked to being better able to listen to and genuinely care for others.

Previous qualitative studies on MBPs for physicians and resident physicians have reported similar themes, such as increased awareness, changes in attitudes towards the self, increased self-care and well-being, and impacts on social interactions [20,23,45–48]. Moreover, a contextual factor that was identified by Beckman and others [45] and Irving and others [46] was the importance of sharing experiences from medical practice with colleagues. This finding highlights the value of enabling resident physicians to attend such programs with colleagues.

The main difference in our findings compared to previous research was the focus of resident physicians on integrating mindfulness into work and daily life through informal mindfulness practices. Although such practices have been mentioned within other qualitative studies [20, 46], participants in the present study reported primarily engaging in informal practices, whereas formal practices were mentioned less frequently. Not finding time for formal mindfulness practices is an often reported difficulty within studies on MBPs for physicians [19], including our own study. Providing within an MBP a focus on informal practices as well as on transfer aspects regarding their implementation into the work context may make mindfulness practices more accessible to resident physicians. However, it has been suggested that a critical threshold of practice time may have to be met to achieve psychological change [49]. Such a threshold may not be reached through informal practices only. Furthermore, formal mindfulness practices may make informal practices more accessible [46]. Consequently, it may not be enough to exclusively focus on informal practices. This issue should be investigated in future research.

Furthermore, our finding of perceived increases in awareness is in accordance with theoretical accounts on mindfulness. Specifically, awareness is a core component of theoretical frameworks on mindfulness and attempts to operationalize mindfulness [e.g. 50–53]. Furthermore, awareness may facilitate the ability to view thoughts and emotions without having to react to them [52]. Such defusion from experience and reduced emotional reactivity are important components of emotion regulation [54] and correspond to the theme of equanimity that surfaced in the data.

Moreover, our finding of the effects on resident physicians' self-care corresponds to studies reporting increases in self-compassion after participating in an MBP [55] or an association between trait mindfulness and self-care [56,57]. Similarly, our finding on perceived increases in well-being after participating in the MBP correspond to findings of quantitative research (for a meta-analysis, see, e.g. 58,59). An additional theme was the positive effects on interactions with patients. Accordingly, a study on health care personnel found a positive correlation between health care workers' trait mindfulness and therapeutic alliance [60].

The main aim of the intervention was to increase resident physicians' well-being. Well-being can be defined as comprising both *hedonic* aspects (i.e., positive affect and satisfaction with life) and *eudaimonic* aspects (i.e., positive functioning) [61]. Effects contributing to all these aspects of well-being were found in our data. Regarding eudaimonic aspects, participants reported feeling more positive and content and mentioned increased satisfaction in their private and work life. Regarding positive functioning, participants reported positive effects on their social interactions. Moreover, they described positive effects on their self-care, which is important for medical professionalism [14,15]. As such, it may contribute to resident physicians' positive functioning at work.

In our study, mindfulness was supplemented by a focus on *Muße*, with the aim of emphasizing the self-care aspect of mindfulness and

increasing well-being. Accordingly, the effects on self-care behavior and well-being were themes that resulted from the analysis. Furthermore, one of the defining characteristics of Muße is feeling liberated of time pressure. In this vein, some participants reported that they were feeling less time pressure when communicating with patients. They also reported being able to switch to a calmer state of mind in their leisure time, rather than extending the feeling of time pressure outside of work. Thus, aspects of Muße were found in the data.

The second aim was to compare experience-based learning to text-based learning about mindfulness. Analysis of the transcripts of the control group revealed similar themes to those reported by the intervention group. However, compared to the intervention group, most participants in the control group reported only minor effects. For instance, they reported that reading the material had given them ‘food for thought’ and that they had become more aware of the importance of certain things, such as self-care or being present in the moment. Furthermore, most of the reports of participants in the control group were notably less concrete than those of participants in the intervention group and often worded as merely trying to experience a specific state of mind, adopt a particular attitude or engage in a certain behavior. Specifically, these reports were mostly missing concrete examples. We conclude that knowledge about mindfulness seems to have less of an impact than practicing mindfulness. This finding is in accordance with theoretical accounts stating that mindfulness is a state of mind that has to be experienced and cannot be accessed through cognitive efforts only [32]. That is, the experience of mindfulness cannot be conveyed through written or oral language completely. Instead, one has to engage in mindfulness practice to gain first-person experience in introspective, nonjudgmental present moment awareness [32]. Accordingly, this first-person experience is necessary to build skills in mindfulness. Although text-based learning may not be a suitable approach to acquiring skills in mindfulness and improving well-being, it may provide an adequate control condition in which participants engage in mindfulness without actually practicing mindfulness. Whereas these findings are exploratory, future research should further investigate and validate this control treatment. Moreover, future researchers using a control condition that receives text-based information should consider using an alternative format of delivery other than e-mail, such as audio recordings, and should include less content to increase participants’ motivation to engage with the material.

The present study has several limitations. First, theoretical sampling was not possible because the study was conducted in an anonymized fashion. However, as described in Section 2.2, saturation of data was ensured by monitoring participant characteristics, including age, sex, specialty, and level of burnout, and inviting participants until no new information was obtained [35]. Second, participants were self-selected. However, our aim was to assess the effectiveness of the MBP in those resident physicians who actually seek to attend such a program to increase the study’s ecological validity. Furthermore, the effectiveness of any MBP hinges on the motivation of the participants, which is expected to be higher among self-selected participants, and such a program cannot be administered passively like a drug [62]. Third, we did not control whether the control group actually read the material that was sent to them. Fourth, this study relied on participants’ self-reports, which is characteristic of qualitative studies. Within the RCT, we have also included objective, implicit and third-person measures.

## 5. Conclusion

The findings of our study show that a tailored MBP can enable resident physicians to integrate mindfulness into their daily life, including work at the hospital, increase perceived self-care, and contribute to their well-being. At the same time, resident physicians reported perceiving a positive impact of the MBP on their interactions with patients. Future research should investigate this tailored MBP for resident physicians by comparing it to standard MBSR.

Comparison of the MBP to a control group that received text-based information on mindfulness showed that the control group perceived minor effects. Future research should investigate the adequacy of this type of control group as an active control for MBPs.

## Credit author statement

ASG: Conceptualization, Funding acquisition, Writing – original draft, developed the initial study concept, obtained funding, contributed to the design of the study, was involved in the development of the adapted mindfulness program, and made critical revisions to the draft of the manuscript. SS: Conceptualization, Funding acquisition, Writing – original draft, developed the initial study concept, obtained funding, contributed to the design of the study, was involved in the development of the adapted mindfulness program, and made critical revisions to the draft of the manuscript. VMA: Formal analysis, Writing – original draft, contributed to the design of the study, was involved in the development of the adapted mindfulness program, conducted the interviews, analyzed and interpreted the reports, and drafted the manuscript. JCF: contributed to the design of the study, was involved in the development of the adapted mindfulness program, contributed to the interpretation of the interviews and revised the manuscript. All authors have read and approved the manuscript and have contributed to the revision of the manuscript.

## Contributors

ASG developed the initial study concept, obtained funding, contributed to the design of the study, was involved in the development of the adapted mindfulness program, and made critical revisions to the draft of the manuscript. SS developed the initial study concept, obtained funding, contributed to the design of the study, was involved in the development of the adapted mindfulness program, and made critical revisions to the draft of the manuscript. VMA contributed to the design of the study, was involved in the development of the adapted mindfulness program, conducted the interviews, analyzed and interpreted the reports, and drafted the manuscript. JCF contributed to the design of the study, was involved in the development of the adapted mindfulness program, contributed to the interpretation of the interviews and revised the manuscript. All authors have read and approved the manuscript.

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## Ethical approval

The study was approved by the Institutional Ethics Committee of the Albert-Ludwigs University of Freiburg (Reference number: 361/16).

## Trial registration

The trial was registered at the German Clinical Trials Register of Clinical Studies (drks.de). The registration number is DRKS00014015, the date of registration was 05/24/2018.

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