

Healthy community-dwelling older adults' experience with a nutritional educational intervention: A feasibility study

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Abstract

Background: Considerable growth in the older adult population is expected worldwide and a large part of this population will be living at home, responsible for their own nutritional behavior and health. Educational nutritional interventions targeting malnutrition in this group have been found effective in increasing nutritional status, but a better understanding of the feasibility and which components a nutritional intervention for older adults should include is needed.

Objective: (1) To conduct a health-promoting and disease-preventing nutritional educational intervention with a theoretical, practical, and digital aspect aimed at healthy community-dwelling older adults; and (2) To evaluate and describe its feasibility through the participants' experience with the intervention.

Method: Three focus group interviews were conducted, using a semi-structured interview guide including 16 participants who attended a multi-component educational nutritional intervention. The focus group interviews were tape-recorded and transcribed ad verbatim then subsequently analysed using systematic text condensation. On day one of the two-day multicomponent intervention, the participants received lectures on nutrition and health-related content, and subsequently followed up with group discussions. On day two, they received a cooking class from a chef and an introduction to a nutritional tracking app.

Results: Three main categories emerged from the analysis of the focus group interviews: (I) Learning environment; (II) content of the intervention; (III) increased nutritional awareness. The participants found the content of the theoretical presentations useful, interesting, and transmissible to their everyday life. However, for some of the participants, the language used was too scientific. A cooking session with a chef was valued as inspirational and the participants were left with ideas and motivation. Being introduced to a digital dietary tool was viewed as valuable, however, the participants did not use the app in their everyday life, as it was too time-consuming.

Conclusion: The results suggest that the duration and the combination of both a theoretical and practical approach in a two-day multi-component educational nutritional intervention for older adults are desirable. The intervention led to increased nutritional awareness and some nutritional behavioural changes in the participants, suggesting the intervention be feasible. However, the potential for optimizing aspects such as facilitation, delivery, and content dissemination in the future educational nutritional intervention is highlighted.

Keywords: nutrition, intervention, community-dwelling, older adults

INTRODUCTION

The global older adult population will grow considerably over the next decade (United Nations, 2017). This trend is also found in Norway, where the older adult population 65 years and older will double from 940 000 in 2020 to 1 880 000 in 2075 (Syse, Thomas, Gleditsch, 2020). In 2021 approximately 40 000 people resided in assisted living facilities and care homes (Statistics Norway, 2022). Hence a considerable part of the population will be living at home and be responsible for their own nutritional behavior and health.

The aging process involves numerous physical changes affecting appetite and food intake (Norman, Haß, Pirlich, 2021), including a gradually decreased sense of smell and taste, hormone regulation changes, and gastrointestinal function. This can affect energy and nutrient intake, subsequently increasing malnutrition risk. This state of inadequate intake of food and nutrients, in addition to physical changes, can be further affected by psychological factors such as loneliness and feelings of depression, as well as social factors such as economic status and food habits,

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either deficient or excessive energy intake, or an unbalanced diet. This can increase the risk of becoming undernourished (Volkert et al., 2019) or lead to the development of non-communicable diseases such as diabetes, hypertension, and cardiovascular disease (World Health Organization, 2021). Evidence suggests that the prevention of malnutrition in older adults through careful attention to nutritional adequacy and a healthy diet could be beneficial in terms of health and quality of life (Shlisky et al., 2017; Volkert et al., 2019).

Health technologies have shown promise in providing support for engaging older adults in nutritional self-care and increasing their awareness of dietary measures to prevent malnutrition (Aure, Kluge, Moen, 2020). Also, educational nutritional interventions have been introduced as a response to the increasing older adult population to enhance health promotion and disease prevention in community-dwelling older adults (Sahyoun, Pratt, Anderson, 2004). Kimura and colleagues found that participating in a social health program for community-dwelling older adults improved their dietary habits and the intervention group had a significantly higher dietary variety score (Kimura et al., 2013). The study showed improved self-rated health, which can be connected to quality of life. Still, there is a need for further research in this field (Rea, Walters, Aygerinou, 2019). A study from 2014 investigated the difference in dietary intake and nutritional risk in two groups who participated in a treatment program and a control program, where the treatment program was suggested to be more effective in reducing nutritional risk (Francis, MacNab, Shelley, 2014). Van Doorn-van Atten et al. found that a multi-component nutritional telemonitoring intervention improved diet quality and nutritional status, in older adults at risk of undernutrition (van Doorn-van Atten et al., 2018). A systematic review published in 2018 reported that older adults may benefit and could achieve better dietary quality if they changed their nutritional behavior based on education and increased nutritional knowledge (Zhou et al., 2018). This was also seen in a study conducted by Curbach et al., where the participant's awareness and knowledge about factors influencing their eating behavior increased as they attended meetings as part of an intervention to promote participation and empowerment regarding healthy nutrition (Curbach et al., 2018).

A review from 2004 found that nutritional educational interventions for older adults were more likely to have positive outcomes when the interventions were directed at specific diseases or conditions (Sahyoun et al., 2004). The interventions should be simple, practical, and precisely targeted to the participants, and had a higher chance of

being successful if the individuals were motivated and able to set their own goals. The review resulted in a framework for nutritional interventions suggesting that a combination of individual-level and environmental-level interventions has a better potential to change dietary behavior. Sahyoun et al. conclude that we need a better understanding of which components a nutritional intervention for older adults should include being better equipped to evaluate their effectiveness (Sahyoun et al., 2004). Also, health literacy, a person's ability, and competence to access, understand, evaluate, and use health information, is key to health promotion and disease prevention and is recognized as a public health goal (Sørensen et al., 2012). Thus making the user perspective essential when developing interventions to ensure that the information given targets the older adult population and their level of health literacy to further increase the effectiveness.

Nutritional educational interventions are a viable and effective way to enhance older adults' nutritional behavior, given that they are precisely targeted to this population. However, we find there to be a lack of literature investigating the intervention's feasibility by exploring healthy older adults' experiences with such interventions and their views on the components of the intervention.

The concept of health literacy is linked to literacy and entails people's knowledge, motivation, and competencies to access, understand, appraise, and apply health information (Sørensen et al., 2012). This is in order to make judgments and decisions in everyday life concerning health-care, disease prevention, and health promotion to maintain or improve quality of life during the life course. Health Literacy covariates with public and individual health in populations and a high level of health literacy is associated with good physical and mental health (Ministry of Health and Care Services, 2019). The definition by Sørensen et al. highlights four competencies that are crucial for health literacy; access refers to people's ability to find health information; "understand" refers to people's apprehension of health information; appraise refers to people's ability to evaluate the information they have accessed and lastly; apply which refers to the ability to communicate and use the information (Sørensen et al., 2012). Nutbeam proposes three dimensions to classify health literacy: (1) Functional health literacy refers to basic skills in reading and writing to function in everyday life; (2) interactive health literacy refers to cognitive skills that, together with social skills, enable participation in everyday activities, and (3) critical health literacy that refers to cognitive and social skills used to critically evaluate information and use this in life (Nutbeam, 2000).

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Table 1. Interview guide

Question 1: "Did you find the information given at the seminar to be relevant?"

Question 2: "Was there information at the seminar that you felt was irrelevant or that there should not have been so much focus on?"

Question 3: "Do you see the seminar as an appropriate way of receiving information about diet and nutrition?"

Question 4: "As you probably remember, the seminar contained both elements of pure learning, group discussions, use of an app and cooking.

a. Is there one or more of the aforementioned forms of information exchange that you find particularly engaging or educational?

b. Was there one or more of the forms of information exchange that you found unengaging or educational."

Question 5: "What do you think about the time frame of the seminar, seen from a learning perspective?"

Question 6: "Have you used the information you received at the seminar in your daily life?"

Question 7: "Do you do anything differently in your everyday life after taking part in the seminar?"

This study was part of a larger research project; MATLYST, where the overall aim was to develop a broader foundation to deliver better information and nutritional advice and develop better food services adapted to changes related to an aging population. This requires knowledge of how to deliver this information in an optimal format for the target group. Hence, this study aimed to (1) conduct a health-promoting and disease-preventing nutritional educational intervention with a theoretical, practical, and digital aspect aimed at healthy community-dwelling older adults and (2) evaluate and describe its feasibility through the participants' experience with the intervention.

METHODS

Study design

The study was a feasibility study with a qualitative design and an inductive approach. This allows focus on the process and helps evaluate intervention efficacy, informing future research. Data was collected through focus group interviews with the participants, a targeted and validated means to explore the understanding of a phenomenon through group discussion and dialogue (Malterud, 2012).

Recruitment of participants

The participants in the study were healthy community-dwelling older adults 67 years (n=29) and above, with access to a tablet, who had taken part in a two-day multi-component educational nutritional intervention. Participants had been recruited for the intervention by distributing a flyer containing study information through the institution's regional network in the western part of Norway, and through study information meetings for nearby groups and organizations with a high proportion of older adults. All participants from the intervention were invited to focus group

interviews, and 22 of these expressed an interest in partaking. Of these, 16 people, 7 women, and 9 men consented to participate in the interviews.

Intervention

Based on previous research showing that nutritional educational interventions should be simple and practical and their potential to increase the participants' dietary quality and nutritional knowledge and awareness, we developed and conducted a two-day intervention. The intervention consisted of two consecutive days filled with nutritional and health-related content. The first day consisted of presentations and group discussions on the topics; of critical thinking regarding advertisement, aging and nutrition, physiological changes related to the aging process and sources of meal joy and appetite, and the social aspect of mealtimes. On the second day, the participants spent time in a kitchen, where a chef demonstrated how to quickly increase the nutritional value of traditional meals and how to make the food more appealing and tasty, all whilst the participants were observing, asking questions and subsequently tasting all the different dishes made. "Appetitus", an application for nutritional tracking, was also introduced to the participants on the second day, which they were granted access to use for an indefinite amount of time (Aure et al., 2020; Aure, Kluge, Moen, 2021). This is an app designed with older adults in mind and contains the following functionalities:

- Meal plan for the whole day presented with appetite-friendly pictures of meals and beverages.
- Food and beverage consumption recording function with the possibility of adjusting the portion size by the user.
- The user's daily intake of energy, proteins, and fluids is presented as filling in a human figure and as graphs that visualizes protein, energy, and fluid consumption relative to recommended daily intake.
- Positive feedback in the form of a full-figure smiling combined with a cheering sound is given to users who reached their energy and fluid goals for the day.

Data collection

The participants (n=16) were divided into three groups of 4, 6, and 6. The groups were stratified by age to ensure group homogeneity (Morgan, 2013): (1) from 67 to 74 years, (2) above 75, and (3) a mix of groups 1 and 2. The three focus group interviews were conducted for two consecutive days in June 2019, approximately nine months after the intervention. All interviews lasted for about 60-70 minutes and were conducted by the same two researchers, respectively, as moderator and co-moderator. A semi-structured interview guide with open-end questions was used to encourage dialogue and discussions among the participants (Table 1).

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Table 2. Example from the analysis step 2, 3 and 4

Preliminary theme	Meaning unit	Artificial quote – condensate	Analytical text
Structure	«I thought it was a nice flow to it. You need both theory and practice; you need both to fulfil one another.»	The participants expressed that a combination of theory and practice was a good approach to learning about nutrition.	According to the participants, two days was a suitable amount of time for the intervention as the days were divided into theory on day one and practice on day two. This structure was described to be engaging and appreciated by the participants, seeing as the theory from day one could be seen put into practice on day two by a chef in a kitchen. The second day was especially appealing and informative as the participants were actively involved and could ask the chef questions whilst he was cooking.

Analysis

Focus group interviews were recorded individually and transcribed verbatim afterward. Data analysis was performed using systematic text condensation (Malterud, 2012). The transcripts from the focus group interviews were read through, and three main themes were identified. Meaning units, and text fragments, were identified from the transcripts and coded in subgroups according to the themes from the first step. The subgroups were again thoroughly analyzed with all researchers present. The meaning units were written into artificial quotes called condensates. In the last step of the analysis, the condensates were rewritten into analytical texts and presented as the study's results (Table 2).

RESULTS

Cohort characteristics

Of the 16 participants, six were between the age of 67 and 74 years, and 10 participants were above the age of 75. The participants were healthy older adults living at home, and 10 out of the 19 were living alone. The participants were well educated; 10 participants had more than four years of higher education, two had less than four years of higher education, and four had a trade school education.

Three main categories emerged from the analysis of the focus group interviews: (I) Learning environment, (II) content of the intervention, and (III) increased nutritional awareness.

Learning environment

Structure

According to the participants, two days was a suitable amount of time for the intervention as the days were divided into theory on day one and practice on day two. This structure was described as engaging and appreciated by the participants, seeing as the theory from day one could be put into practice on day two by a chef in a kitchen. The second day was especially appealing and informative as the participants were actively involved and could ask the chef questions whilst he was cooking. Some participants expressed a need for follow-up meetings after

the intervention to maintain interest.

"I thought there was a nice flow to it. You need both theory and practice, and they complement each other very well."

Setting

The participants also addressed the physical surroundings of the intervention. Some said that it was difficult to read the presentations on the screen due to lighting and distance.

"It was unfortunate that the lighting made it difficult for us in the back to read the presentation, although we heard what was said."

"It is very important to consider that some of us may have impaired vision or hearing."

The facilities should also be inspiring to enhance motivation.

"I enjoyed being in the kitchen together with the chef".

Social engagement

All groups expressed and highlighted a need for more time to get acquainted with the other participants. Insecurity and self-doubt before engaging in group discussions, following the theoretical presentations, were described as an obstacle to fully expressing themselves and partaking in discussions.

"I thought it was too early with group discussions. I did not know the other people. I am usually not shy, but you get a little shy when you don't know the topic of discussion very well."

Content of the intervention

Relevance

Nutrition in older adulthood was highlighted as an important topic in all three groups. Information on nutrients and dietary guidelines was viewed as interesting, valuable, and important from a health promotion and prevention perspective. Some participants said it was too general and somewhat hard to relate to, as the nutrition information was directed to the general public and not aimed at specific diseases or patient groups. Despite this, they still saw its usefulness for the future and said it was good to be reminded of the public health guidelines for healthy nutrition in ageing.

"It was not that it was not relevant, but I felt that it was more aimed toward the future. It is good

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to be prepared.”

The app "Appetitus" was somewhat relevant and inspiring, but most of the participants neglected to use it and deleted it shortly after the intervention. It was too complicated and time-consuming to use, and the general agreement was that it was more suitable for future generations.

“It was too time-consuming to register every meal and write (...) I don't think older adults will use it.”

Some of the participants said that they used the app occasionally to check their nutritional intake, and one participant described it as a great tool for optimizing healing after surgery.

“I have had surgery, and they told me that the most important thing was to change my diet to heal well, concerning my age and all (...) the app was very useful then.”

Dissemination

Although the content of the intervention was interesting, the language was too theoretical. The dissemination involved some scientific terminology, which some of the participants felt was not sufficiently translated into a lay language, making it hard to follow. The aim of the intervention should, to a greater extent, have been clarified, as some participants expressed confusion regarding the scope of the intervention. It was also suggested that the intervention could have started with something more inspiring than scientific information.

“There was some theory that went straight by me, like checklist and graphs.”

Increased nutritional awareness

Nutritional and social value of meals

Information about the availability of protein-enriched food products was especially highlighted as means. Some participants even disclosed that they had become more aware of certain foods and nutrients they should incorporate into their diet to ensure adequate intake.

“I have become better at eating yoghurt, as I don't drink milk, to get the nutrients from milk that I apparently need.”

An increase in awareness regarding the importance of the social aspects of meals was discussed in the group. Several of the participants could relate to close family and friends and highlighted that cooking and eating alone would be lonely, and could potentially lead to a lower intake of food.

“I have older siblings with this problem, they find it lonely eating alone and then forget to eat, and then they don't eat enough.”

Critical thinking

The participants expressed that they had become more reflective towards information aimed at them, especially with regard to critical thinking and the

importance of having a healthy skepticism towards advertisements selling nutritional supplements.

“There are all these vitamin pills promoted by celebrities (...) that you don't have to spend money on. I got that tip there (at the intervention) and started to do some research on my own.”

Routine change

Meal frequency was emphasized as an issue that several participants had yet to be aware of before the intervention. Increased awareness of meal frequency led to a change in some of the participant's everyday life. They now ate more evenly throughout the day and had become more watchful over how many meals they had during the day to ensure adequate intake.

“What remains very strongly is the information about the time period between the last meal of one day and the first meal the next day, those 11 hours that we talked about. I have passed on that information to others.”

Several participants said that they started to add more spices and taste to their food to make it more appealing and tasty after being inspired by the chef. They also utilized the recipes that the chef handed out during the cooking session.

“I have a tendency to say that I use salt and pepper, and suddenly I got information about how to make the food taste better (...) I have used that a lot.”

DISCUSSION

In this study, results show that a two-day nutritional educational intervention is feasible and that the learning environment, such as structure, setting, and social engagement, as well as the content of the intervention in terms of relevance and dissemination, are key components for a successful intervention aimed at healthy community-dwelling older adults. Results showed that the participants nutritional awareness increased, leading to them being more conscious of the meal's nutritional and social value, critical thinking towards information, and change in their own routines. Thus suggesting that the participants took health-promoting and disease-preventing actions in their daily life after participating in the intervention.

The aim of this study was to (1) conduct a health-promoting and disease-preventing nutritional educational intervention with a theoretical, practical, and digital aspect, aimed at healthy community-dwelling older adults and (2) evaluate and describe its feasibility through the participant's experience with the intervention. This study provides novel and valuable knowledge from the older adult population's perspective about nutritional educational interventions and their usefulness and feasibility. Participation in nutritional

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educational programs has the potential to ensure healthy aging and facilitate independent living among the older adult population (Saffel-Shrier, Johnson, Francis, 2019).

The learning environment was highlighted by the participants as essential when receiving new information. Hence the structure and settings are important to consider when designing an intervention for this population. There was a general agreement that a two-day intervention was an adequate length, and the practical part of the intervention was the most inspiring. Hands-on activities and practical tasks should be incorporated into interventions to increase the probability of uptake and success in older adults (Sahyoun et al., 2004).

Uemura and colleagues found in a randomized controlled trial that an active learning program with weekly sessions involving group work and self-planning of behavior change to promote a healthy lifestyle significantly improved health literacy, and dietary variety and prevented functional decline (Uemura, Yamada, Okamoto, 2021). The program lasted for 24 weeks, highlighting the importance of long-term interventions. Our results show that regular input of information and follow-up after the intervention are crucial for long-term change. Yet, previous research shows that adherence to nutritional interventions is poor (Rea et al., 2019).

The results reveal that the participants needed more time to get acquainted before the group discussions, hereby hindering their social engagement. This might have compromised their ability and desire to share their opinions and experience with their group. Curbach et al. stated that group dynamic and spirit is key to encouraging discussion and dialogue (Curbach et al., 2018), and results from this study propose that this aspect needs more attention when including group discussions in an intervention.

The content of the intervention was aimed at the older adult population. However, the participants found the information in the intervention too general and not relatable. They found it challenging to adapt the information to their own lives as they had few perceived nutritional issues, and they had, expected to get individualized recommendations. Sahyoun et al. suggest that the aim of the intervention should be clearly stated, and nutritional intervention should be targeted to the audience for optimal adoption of the information (Sahyoun et al., 2004).

Results show a poor uptake and use of the app, *Appetitus*. Some found it inspiring initially, and a few participants saw its usefulness when tracking their intake in times of need, such as recovering

from surgery or illness. Introducing technology to the older adult population has the potential to assist them in a healthy, independent lifestyle (Geraedts et al., 2021). Most of the participants lost interest in using the app and described it as time-consuming and impractical, and long-term use was not reported. Takemoto et al. found that technology needs to have value, appear beneficial and be clearly useful for older adults to ensure adoption (Takemoto et al., 2018). We found that using an app in disease prevention and health promotion in a group of generally healthy older adults might not have the desired effect, as we found that several of the participants did not see the immediate value of employing a tool that they described as very time consuming as a preventive measure.

The Norwegian Directorate of Health published, 2021, a report from a national survey of the population's health literacy and presented the population's self-reported health literacy (Le, Finbråten, Pettersen, Joranger, Guttersrud, 2021). The report indicated that a considerable part of the Norwegian population finds accessing and evaluating health information challenging. In our study, the participants said that the dissemination of information became too theoretical in terms of language and presentation of graphs and tables, which affected their ability to appraise the information. This emphasizes an important aspect showing that the quality of information is not significant if the dissemination is not targeted to the participants, regardless of their level of health literacy (Sørensen et al., 2012). Despite this, the participants could still apply the information they were given and saw its usefulness. They discussed and agreed that it was always helpful to be reminded of the public health guidelines for healthy nutrition and how to decrease the risk of non-communicable diseases. This relates to Nutbeam's concept of functional health literacy, which is linked to an improvement in knowledge of risk and adherence to recommendations (Nutbeam, 2000; Sørensen et al., 2012).

Although the learning environment and the content of the intervention were not optimal, there is evidence that suggests a change in the participants' nutritional awareness. This can be related to Nutbeam's concept of interactive health literacy, which refers to the skills to derive meaning from information and use that in our surroundings (Nutbeam, 2000). Awareness of the meal's nutritional value shows that specific and simple recommendations were followed up. Major changes in attitudes and lifestyle were not mentioned, which can be related to a lack of follow-up meetings and that the intervention was not individualized. Southgate et al. found that interventions have a greater potential for change if the content is customized to each individual par-

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ticipant (Southgate, Keller, Reimer, 2010), substantiated by the findings showing that the group who received personalized letters and booklets during a one-month follow-up period had a significantly greater increase in dietary knowledge, compared to the group that only received letters.

The participants became more aware of the power of media and advertisement, which relates to Nutbeam's third concept, critical health literacy, which refers to skills that can be applied to critically analyze information and use that information (Nutbeam, 2000). This was also seen by Curbach et al., where the participants' eating behavior did not change after a health-promoting intervention, but their shopping behavior and critical awareness of advertisements were affected by the program (Curbach et al., 2018).

An increase in nutritional awareness can also be seen in the participants' change in routine, where several reported that they had become more aware of meal frequency and the addition of more taste in their food. Hence we can assume that they have reflected on the information and then applied it to their own life, suggesting an increase in their interactive health literacy (Nutbeam, 2000).

Strengths and limitations

This study provides novel information about the feasibility of nutritional educational interventions for healthy older adults based on their experience of a two-day intervention. Thus informing new, more comprehensive interventions and targeting these to optimize the effectiveness of nutritional behavior. The study has some limitations as the interviews were conducted nine months after the intervention, which increases the risk of participant recall bias. Of the total number of participants from the intervention (n=29), only 16 took part in the focus group interviews, thus making this a small study. The participants were also highly educated, indicating that this type of intervention might be more appealing to this population. However, the reliability of the study is increased by an accurate performance and description of the analysis, which was done by two of the same researchers that took part in the

intervention. The phenomenological analysis investigates a phenomenon from the participants' perspective (Malterud, 2012). Researchers must approach the data with an open mind and no preconceptions that might influence their ability to objectively analyze it. To ensure the validity of the study, the methodological approach was well suited to fit the aim of the study, which was to explore older adults' experience with a phenomenon. The age range of the participants suggests a good variety in the older adult population which gives a wide range of material. Yet the participants were highly educated, which might influence their experiences and responses during the interviews. The same interview guide was used for all interviews and conducted by the same researchers to ensure internal validity.

Implications

This study provides novel information about the structure and content of nutritional educational intervention from the participant perspective as expressed by themselves. There is a need for research in this field to optimize nutritional educational interventions for the healthy older adult population. Future large-scale studies should be targeted to the population's level of health literacy to be effective.

CONCLUSION

The results suggest that the length of the intervention and the combination of both theoretical and practical approaches to delivering a two-day multi-component educational nutritional intervention two days was highly appreciated. Our results show increased nutritional awareness and some nutritional behavioral changes. This suggests that the two-day multi-component educational nutritional intervention for healthy community-dwelling older adults is feasible. However, we find there to be potential for optimizing aspects of the intervention such as facilitation, delivery, and content dissemination. Future interventions that aim to promote healthy dietary behaviors in older adults should seek to develop content and tools that cater to the older adults' language, interests, and current health status- including sensory capabilities.

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