

BMJ Open Investigating facilitators and barriers of university-based administrative staff, residents and researchers to implement an active breaks intervention: a mixed-methods study

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ABSTRACT

Objective This study aims to analyse the barriers and facilitators towards an implementation of active breaks (ABs) intervention inside the workplace.

Methods This study used a mixed-methods approach, incorporating virtual focus groups and an online questionnaire, conducted among the workers of Alma Mater Studiorum - University of Bologna (Italy). A total of 30 participants (N=30), including administrative and academic staff, PhD candidates, specialised trainees and research fellows, were involved in the study. Key themes and subthemes related to the barriers and facilitators of ABs interventions at the university were identified and categorised according to the three levels of the socio-ecological model.

Results The most commonly reported barriers are: lack of time, lack of motivation (intrapersonal level); lack of influence, lack of awareness (social level); physical space, organisational support (environmental level). The most commonly reported facilitators are: access to information, flexible work hours (intrapersonal level); group support, awareness programmes (social level); adequate spaces, organisational structure (environmental level). A significant majority (81.48%) recognised the problem of sedentary time at work, with strong interest (92.59%) in workplace interventions to reduce it. Flexibility in timing for ABs (44.44%) was preferred over fixed schedules, with preference for dedicated areas (37.04%) and outdoor spaces (29.63%). The majority (62.96%) preferred taking ABs in small groups open to all, with a qualified kinesiologist (40.74%) leading the management.

Conclusions This study identified barriers and facilitators to an ABs intervention from the perspective of administrative staff, residents and researchers. These findings could help institutions foster an environment that promotes physical activity, reduces sedentary behaviour and promotes the well-being and safety of workers through an integrated and individual-centred approach.

INTRODUCTION

General problem

Sedentary behaviour (SB), defined as any waking behaviour with an energy expenditure

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ Our study is a mixed-methods study.
- ⇒ A qualitative-quantitative approach was implemented in order to design a future intervention.
- ⇒ The sample size was relatively small.
- ⇒ Conducting qualitative research with large samples is often very difficult.
- ⇒ Each focus group, to give space to all, was conducted with a limited number of people.

lower than 1.5 metabolic equivalent of task is associated with adverse health outcomes independently of levels of physical activity (PA).¹ Occupational sitting is a health hazard for workers.² Workers adopting prolonged sitting higher than 60 min without any break have an increased risk of metabolic syndrome, obesity and cardiovascular disease.³ SB has been negatively associated with various health markers, such as sarcopenia, osteopenia, diabetes, hypertension, metabolic syndrome, cardiovascular disease, overweight, obesity and stress.⁴⁻⁷

The risk associated with sedentary time and all-cause mortality has been shown to be more pronounced at lower levels of PA than at higher levels.

This trend is increasing, especially among desk-based workers who are exposed daily to a high amount of sedentary time and decreased work performance.⁸ Consequently, interrupting sedentary time with PA emerges as a valuable strategy for addressing SB.^{1 9 10} PA, defined as any bodily movement that produces energy expenditure,¹¹ has been studied in the last decade suggesting a positive association between higher levels of PA and lower risk of mortality. Many literatures suggest that engaging in PA provides

advantages for various health outcomes, reduced cardiovascular disease, lowered risk of developing hypertension, decreased likelihood of specific types of cancer, reduced incidence of type-2 diabetes, improved mental health with decreased symptoms of anxiety and depression, enhanced cognitive function and better sleep. Adults are recommended to engage in a minimum of 150–300 min of moderate-intensity aerobic PA per week, or at least 75–150 min of vigorous-intensity aerobic PA per week.¹² A recent study suggested that 60–75 min of Moderate to Vigorous Physical Activity (MVPA) per day (the highest quartile) can attenuate, and even eliminate, the detrimental association between SB and health outcomes.¹⁰

However, according to the most recent data, in the Europe (EU), just over a quarter (26.9%) of people aged 18–24 years and more than one-fifth (20.5%) of people aged 25–34 years met the recommended levels of PA in a typical week in 2019. This percentage progressively decreased with age, dropping to 7.4% among those aged 65 years and older.¹³ According to data collected by the National Institute of Health through the ‘Progressi delle Aziende Sanitarie per la Salute in Italia’ surveillance system in the 2-year period 2022–2023, 28% of Italians between 18 and 69 years old are completely physically inactive. A sedentary lifestyle increases with age, is more widespread among people with a low level of education and among those who report economic difficulties.¹⁴

In this context, supporting workplace initiatives that encourage PA and decrease extended periods of SB emerges as a feasible approach in occupational health, addressing both the physical and mental dimensions of well-being.

Benefit of PA intervention in work setting

Active breaks (ABs) are defined as short bouts of structured PA or exercise. The majority of research related to the implementation of ABs intervention has primarily focused on younger children in primary and secondary schools.^{15,16} The collected evidence in children and adolescents suggested that ABs improved PA levels, reduced SB and increased cognitive function and attention.^{17–19} ABs have been implemented in office workers to reduce SB, low back pain, discomfort and increase work productivity.²⁰ A 2023 study showed that interrupting prolonged periods of SB with 5 min every half hour can significantly improve cardio-metabolic and mental health. In particular, these ABs reduced post-prandial glucose levels by 58%, an effect comparable to that of some anti-diabetic drugs. Furthermore, reductions in systolic blood pressure comparable to those achieved with regular exercise for 6 months were observed.²¹ A recent article conducted in Spain suggested a positive impact after ABs inside university context for cardio-respiratory fitness and PA levels.²² The systematic review of Waongenngarm *et al*²⁰ showed that ABs with postural changes were found to be effective in reducing discomfort and pain. Nonetheless, they suggested that there is insufficient real-life workplace contextualisation to provide more detailed information about the type of

breaks and the break protocol. So, to date, scientific literature regarding breaks and energy management strategies during working time is growing.^{23,24}

Benefits of formative studies

The majority of studies in scientific literature presented a top-down approach. However, the bottom-up approach is sustainable and effective for quasi-experimental studies that aim to assess the effectiveness of a real work intervention. Qualitative research frequently offers a deeper understanding and captures individual subtleties that quantitative surveys might overlook. This stems from the constraint of fixed-response self-report surveys, which can restrict individuals from elaborating descriptively on their emotions or perspectives.²⁵ A widely used qualitative research method entails organising focus groups (FGs), wherein small groups engage in discussions facilitated by a moderator. Throughout these sessions, participants react to prompts designed to uncover their thoughts, beliefs and attitudes regarding a specific argument.²⁶ The use of this strategy allows researchers to know more about people’s opinions, attitudes and beliefs toward health promotion and their perceptions of prevention programmes more generally.^{27,28} In health promotion settings, FGs aim to brainstorm ideas for newly developed programmes and assess whether a programme aligns with the requirements of a specific community or setting. An essential aspect of employing FGs involves offering an ‘organizing framework’ for participant discussions. This framework connects the conversation to the fundamental principles of health promotion and serves as a foundation for exploring various barriers and facilitators influencing the implementation or involvement in ABs. The social-ecological model (SEM) serves as a valuable heuristic framework for this objective, chiefly because it acknowledges numerous interconnected levels of influence that can impact individual behaviour. Initially introduced by Bronfenbrenner²⁹ to comprehend the ecology of human development, the SEM suggests that individuals exist at the intersection of various organised ‘systems’, each exerting its influence on behaviour. According to the SEM, the decision to adopt a healthy lifestyle is shaped by a combination of intrapersonal, interpersonal, institutional, community and structural (policy) factors.³⁰ The adoption of healthier behaviours is not driven only by internal motivation (personal beliefs, knowledge thoughts) but is related to external factors such as social norms within the community, structural barriers like resource access, environmental constraints, cultural norms and economic conditions. These elements collectively shape decision-making because individuals are socially embedded and interact with others across various levels. Increasingly, the SEM is being applied to assess the suitability of health promotion programmes and gather insights into their perceived effectiveness and feasibility.^{31,32}

Starting from this point of view, our study aims to first analyse the barriers and facilitators towards an implementation of ABs intervention inside the workplace. In order

to do that we conducted FGs with different professional figures inside the university.

Our research question is ‘Which are the barriers and facilitators towards an implementation of ABs intervention inside the workplace?’. The research hypothesis is that starting from the FGs with the university workers, it would be more feasible creating an ABs intervention that can be sustainable and well-tolerated inside the university community in the future. Based on the present study findings, the ABs intervention will be designed and implemented in the university setting.

MATERIALS AND METHODS

Design and setting of the study

This study used a mixed-methods approach, employing virtual FGs complemented by an online questionnaire. It serves as Phase 1 of a broader ABs study, the ‘Stand Up University, break sedentary behaviours: UNIFIT’ study. The primary objective of the entire UNIFIT study is to evaluate the impact of implementing diverse interventions and incentives aimed at reducing SB and encouraging PA within the university community. Specifically, the study aims to assess whether these interventions lead to enhanced perceptions of health and well-being among administrative and academic staff, PhD candidates, specialised trainees and research fellows of Alma Mater Studiorum - University of Bologna (Italy). With this Phase 1 study, we conducted FGs in order to detect barriers and facilitators towards potential ABs interventions.

The conduct of the FGs adhered to the standards for the Qualitative Research Reporting Checklist and took place at the Alma Mater Studiorum - University of Bologna (UNIBO). Apart from being affiliated with UNIBO, there were no exclusion or inclusion criteria for participation in the FGs. The study followed the Declaration of Helsinki. Participants were recruited through invitation letters sent to department heads, directors of specialised courses, for example, hygiene and preventive medicine, sports

medicine, physical and rehabilitative medicine, occupational and forensic medicine, psychiatry and community medicine, and PhD programmes.

All participants were contacted regarding the study via email invitations with a link to the study document, which contained participant information and consent forms. The participants provided informed consent at the time of registration. Following informed consent, participants completed an online questionnaire using Microsoft Forms, as well as selecting the FGs in which they preferred to participate. A member of the research staff then contacted the participants to confirm the date and time of the FG.

Participants

Each FG comprised no more than 10 participants as suggested by recent qualitative study guidelines.³³ Sessions were conducted using the Microsoft Teams platform for real-time synchronous communication and were audio-recorded following informed consent from all participants. Before each session, the moderator outlined basic rules, ensuring confidentiality, the use of pseudonyms, freedom of expression and mutual respect for opinions.

Focus groups procedures, data collection and analysis

FG was conducted using open-ended prompts introduced by the moderator. The FGs questions are reported in [table 1](#). In addition to the moderator, two observers participated non-intrusively in the online FGs sessions. The moderator initiated the discussion with a general ‘icebreaker’ question to foster familiarity among participants. A co-moderator helped the moderator to manage and organise the session, asking for more detail from the participant when necessary or creating a dynamic situation. Observers took note of participants’ expressions and intonations. Thematic saturation was achieved when participants could no longer provide additional information on a particular topic. Content qualitative analysis was employed to examine the FGs transcripts, with the entire

Table 1 Focus group questions

Phase	Questions
Opening probe to start the discussion	▶ How much time do you spend sitting during working hours?
Management of the working day:	▶ How much time do you spend standing during working hours?
investigate movement habits during the working day and in free time	▶ When you take a break, do you stay still or do you move?
Introducing the concept of ‘active breaks (ABs)’	▶ Do you think you move enough during working hours?
	▶ Do you practice physical activity outside of working hours?
	▶ How do you get to the workplace?
Knowledge and reflections on work-based interventions to promote physical activity. Barriers, facilitators and strategies	▶ Are you familiar with the experience of active breaks?
	▶ In your opinion, what are the advantages/disadvantages barriers/facilitators that could emerge in implementing an AB experience in your working environment taking into account individual, social and environmental factors?
	▶ Do you think your working environment has a friendly and socially accepted approach towards this activity?
	▶ What measures could be put in place to overcome any barriers in your work environment?

ABs, Active Breaks.

research team involved in identifying and categorising emerging themes. Data coding was independently conducted by two researchers, with a third involved in discussion to reach consensus. Final themes were generated after further discussions and confirmations within the team to ensure thematic saturation.

Qualitative content analysis, a flexible and dynamic strategy, was employed to analyse the content of the FGs discussions. At each stage of the process, discussions among the research team contributed to identifying key issues in the transcripts of the audio recordings. Three members of the investigative team meticulously read each transcript line by line and coded the information inductively. This involved consolidating the notes from the observers and the moderator into a single document. Subsequently, after carefully reading the transcripts, the investigative team created a thematic description grouping similar concepts (eg, individual, physical and social, and then within each category, barriers vs facilitators) based on phrases or ideas labelled (coded) based on their meaning. Two researchers independently coded the data, with a third researcher involved in discussions to reach a consensus; codes are grouped into broader themes representing patterns in the data. Final themes were generated after further discussions and deliberations within the entire team to ensure thematic saturation. Themes are illustrated with quotes and interpreted in relation to research objectives. All coding and derivation of subthemes were guided by the SEM.²⁹

Questionnaire

For this mixed-methods study, an ad hoc online questionnaire was developed and administered to the same participants of the FGs. The questionnaire included information regarding their attitudes toward engaging in ABs, as well as their perceptions of the expected benefits, advantages and disadvantages of ABs. The questionnaire presented nine questions divided into four sections: (1) personal data (2) sedentary activity (3) planning of ABs and (4) expected benefits of ABs. Each participant can select a single option that fits more with their beliefs and thoughts, with the sole exception of question number 5, for which a maximum of two responses could be provided. The answers were reported as frequency (percentage).

RESULTS

Focus group

The FGs comprised 29 participants (21 women and 8 men), with an average age of 40.97 years (SD: 12.28). The participants were categorised into professional roles as follows: 12 hygiene specialisation trainees, 8 professors, 4 administrative staff members, 3 research assistants and 2 PhD candidates.

In detail, a total of seven FGs were conducted. The first involved nine participants, including seven hygiene specialisation trainees, one administrative staff member and one research fellow. The second included four

participants (two research fellows, one hygiene specialisation trainee and one administrative staff member). The third comprised seven participants (four hygiene specialisation trainees, two PhD students and one professor). The fourth involved three participants (two professors and one administrative staff member). The fifth included two participants (one professor and one administrative staff member). Finally, both the sixth and seventh FGs involved two participants each, all professors.

At the time of the FGs, approximately half of the participants were familiar with the concept of ABs, mainly through knowledge of the activities carried out by the research team or from previous experiences abroad. However, none of the participants had ever engaged in ABs in a structured manner within the university setting. For those without prior knowledge of ABs, the research team provided only general information in order to avoid influencing their perceptions in any way.

Key themes and subthemes that emerged from the data regarding barriers and facilitators to the inclusion of ABs interventions in the university were classified according to the three levels of the SEM. Table 2 reports the facilitators and barriers discussed during the FG based on SEM.

Barriers

At the individual level, several participants highlighted a range of obstacles that could limit participation in ABs. Among these, work commitments emerged as one of the primary challenges, with some participants noting the difficulty in finding the necessary time to interrupt work activities to engage in ABs. One participant stated, 'I often feel like I can't take a break because my workload is too demanding'. Additionally, the lack of individual propensity for PA was cited as a significant barrier, with some participants admitting to struggling to find motivation to adopt a more active lifestyle. As one participant noted, 'I know it's good for me, but I just can't bring myself to do it regularly'. Some also mentioned the tendency towards SB and laziness as significant barriers to overcome, with one person sharing, 'When I sit down at my desk, time just flies by, and I don't even realize I haven't moved for hours'.

From a social perspective, negative opinions or indifference from others, including employers and colleagues, can negatively influence participation in ABs. Some participants expressed fear of being judged by others for interrupting work for an ABs. One participant mentioned, 'I feel embarrassed to stand up and move around when everyone else is focused on their work'. Furthermore, the lack of knowledge and understanding about ABs was identified as another social barrier, with some participants reporting a lack of information on how and why to adopt ABs. As one individual remarked, 'I've never really seen anyone doing these activities, so I don't even know where to start'.

At the environmental level, the lack of adequate physical spaces to perform ABs emerged as one of the main barriers. Some participants highlighted the absence of

Table 2 Barriers and facilitators based on SEM

Model	Barriers	Facilitators
Individual level	<ul style="list-style-type: none"> ▶ Work commitments ▶ Low individual propensity for PA ▶ Lack of long-term consistency (ABs are initially implemented but later abandoned) ▶ Laziness ▶ Performing ABs individually, instead of scheduling sessions that encourage group participation ▶ Modesty ▶ Managing all aspects of ABs autonomously (eg, timing, mode and activities to perform) ▶ Stream of thoughts that make time pass unnoticed ▶ Work rhythms 	<ul style="list-style-type: none"> ▶ Having knowledge available about ABs ▶ Engaging in and experimenting with ABs ▶ Flexibility of staff working hours ▶ To have an alert ▶ Taking ABs independently when possible
Social environment	<ul style="list-style-type: none"> ▶ ABs may be considered a waste of time by the employer or colleagues ▶ Feeling embarrassment and fear of judgement from others ▶ Socially unacceptable intervention ▶ There is a lack of knowledge about ABs ▶ Inability to form a group to engage in ABs, due to the flexibility of university work ▶ Cultural barrier 	<ul style="list-style-type: none"> ▶ Making the activity engaging and fun ▶ Inform the entire work environment about the topic ▶ Group cohesion: relationship, comparison and socialisation ▶ Engaging in activities with everyone allows for breaking down the barrier of judgement and inhibition ▶ The setting in which the preventive medicine building is located is perfect to implement ABs ▶ Conducting as many ABs as possible to positively influence other colleagues ▶ Building a network ▶ Providing the opportunity ▶ There should be a person who initiates the ABs every 2 hours ▶ Increasing awareness about the topic can help to achieve greater adherence ▶ Inclination within the culture to accept this intervention ▶ Peer involvement ▶ Having someone to indicate when to take them
Physical environment	<ul style="list-style-type: none"> ▶ Inadequate physical spaces ▶ Different organisation of work activities among colleagues ▶ It is difficult to set a specific time for taking ABs ▶ To sweat ▶ Clothing ▶ Challenging exercises ▶ Lack of examples of ABs ▶ Work environment lacking green spaces ▶ Number of participants in the same space (due to the lessons learnt from the pandemic regarding crowding) ▶ Unstructured activity 	<ul style="list-style-type: none"> ▶ Start gradually with simple exercises ▶ ABs proposed by the department ▶ In summer, they can be carried out outdoors ▶ Ability to perform ABs in any space ▶ Varying the exercises ▶ Conducting ABs could help in better pacing work time ▶ Having a structured intervention ▶ Working in small heterogeneous groups

ABs, active breaks; PA, physical activity.

green areas or open spaces within the work environment, making it difficult to engage in outdoor physical exercise. One participant stated, ‘There’s no dedicated space for movement, and I don’t feel comfortable exercising in the middle of the office’. Additionally, the lack of an organisational structure that supports and promotes ABs was identified as another environmental barrier. The absence of an organisational culture that values employee health and well-being could hinder efforts to implement and

sustain ABs. As one participant explained, ‘If the organization doesn’t actively support it, it just doesn’t feel like a priority’.

Facilitators

However, despite the identified challenges, several facilitators were identified during the FGs. At the individual level, the availability of knowledge and information about ABs was cited as an important facilitator. Participants who



had access to information and resources on how to adopt ABs were more inclined to actively participate. As one participant noted, 'Knowing the benefits and having clear instructions makes it much easier to integrate ABs into my routine'. Additionally, flexibility in work hours was considered another facilitator, allowing employees to adapt ABs to their work schedules. One participant shared, 'Being able to choose when to take an active break helps me manage my workload without feeling pressured'. Another highlighted the importance of gradual implementation, stating, 'Starting with simple exercises makes it easier to stick with the habit'.

From a social perspective, group cohesion and mutual support among colleagues were identified as key facilitators. Participating in ABs as a group can reduce feelings of isolation and increase a sense of belonging to the workplace community. One participant explained, 'Doing ABs together removes the fear of judgment and makes it more enjoyable'. Furthermore, raising awareness and informing the entire workforce about ABs can help create an organisational culture that promotes PA and well-being. A participant suggested, 'If we talked more about ABs and had a structured approach, more people would join in'. Another mentioned, 'Having someone remind us every two hours to take an active break would be really helpful'.

At the environmental level, the availability of adequate physical spaces and the presence of an organisational structure that supports and promotes ABs are essential to facilitating participation. Green spaces or open areas within the work environment can provide suitable locations for outdoor ABs. As one participant said, 'In the summer, it would be great to do ABs outside'. Additionally, an organisational culture that values employee well-being can promote the adoption and maintenance of active behaviours. One participant remarked, 'If the department actively encouraged ABs, it would be easier for everyone to participate'. Another highlighted the importance of structured interventions, stating, 'It would help if we had a clear schedule and designated spaces for active breaks'.

Questionnaire

Among the 29 participants in the FGs a total of n=27 completed the questionnaire.

The questionnaire revealed several interesting trends. Most participants identify as partially sedentary and active (48.15%), followed by those who consider themselves sedentary but physically active (40.74%). The majority (81.48%) acknowledge that sedentary time at work is a problem. However, there is strong interest (92.59%) in participating in workplace interventions to reduce sedentary time. Flexibility in timing (44.44%) is preferred over fixed schedules. Dedicated areas (37.04%) and outdoor spaces (29.63%) are preferred locations for taking ABs, while the majority (62.96%) prefer to take these breaks in small groups open to all. Preferences for the type of ABs are evenly split between specific exercises, general

PA and a combination of both. Lastly, the preferred management of ABs is led by a qualified sport scientist (40.74%), followed by group management after a brief explanation by the exercise scientist (22.22%). [Table 3](#) reports the questionnaire results for questions one to eight (completed after the FGs).

Concerning question number 9: 'What results do you hope for?', the participants prioritised increased psychophysical well-being, stress reduction and improved attention ([figure 1](#)).

DISCUSSION

Our study contributed to enriching the literature regarding ABs programmes in workers. Most studies in recent years have focused on ABs in school-age children and adolescents^{15 34} and the majority of the studies performed among adults have a quantitative nature. For this reason, our mixed methods study brings important data to the scientific context underlying the main barriers and facilitators towards the implementation of ABs intervention inside the workplace.

Focus group

The findings of this study highlight a complex set of barriers and facilitators that individuals may face in incorporating ABs into their academic work routine.

At an individual level, work commitments represent the most important challenge. Participants struggle to find time to pause their work for ABs, highlighting the intense demands of their professional responsibilities. Academics and researchers are often under pressure to publish, teach and obtain funding, with strict deadlines and ambitious goals. Previous scientific studies have already highlighted the stressful nature of academic environments.^{35 36} This may indicate that the pressure to maintain productivity may overshadow the perceived benefits of ABs for many. This finding aligns with existing literature suggesting that high workloads and time constraints are common barriers to PA in the workplace.³⁷ Work culture can influence this context: a work environment that often prioritises immediate productivity at the expense of long-term well-being can create an environment where ABs are perceived as a waste of time rather than an investment in health and future productivity.

However, participants suggested a key facilitator: flexible working hours to overcome this barrier. This flexibility allows academic workers to fit ABs into their work commitments, which often include a variety of activities without set hours. The ability to customise ABs to workers' individual needs not only encourages greater programme participation, but also accommodates the dynamic and variable nature of academic work.

A significant obstacle that has emerged was the individual's lack of propensity for PA. Several participants admitted to having difficulty with motivation, as some individuals are not naturally inclined towards PA and may find it particularly difficult to initiate and maintain ABs.

Table 3 Questionnaire results

Questions	
1. After participating in the focus group, which option best describes you	<ul style="list-style-type: none"> ▶ A physically inactive and sedentary person 1 (3.70%) ▶ Sedentary but physically active 11 (40.74%) ▶ Partially sedentary and active 13 (48.15%) ▶ Non-sedentary and physically active 2 (7.41%)
2. Is the time you spend sedentary at work a problem for you?	<ul style="list-style-type: none"> ▶ Sometimes 22 (81.48%) ▶ Yes 3 (11.11%) ▶ No 2 (7.41%)
3. If workplace interventions or opportunities were organised to reduce sedentary time, would you participate?	<ul style="list-style-type: none"> ▶ I would definitely participate 12 (44.44%) ▶ I would participate, but not consistently 13 (48.15%) ▶ I would like to participate, but realistically I cannot 2 (7.41%) ▶ I would not participate 0
4. What do you think is the best timing? (Choose one option only)	<ul style="list-style-type: none"> ▶ Fixed frequency two times a day 12 (44.44%) ▶ Fixed frequency more than two times a day 1 (3.70%) ▶ With flexible hours 12 (44.44%) ▶ Without fixed schedules 0 ▶ Once every 2 hours 2 (7.41%)
5. Where would you prefer to take active breaks? (Choose a maximum of two options)	<ul style="list-style-type: none"> ▶ At my workstation 10 (20.83%) ▶ In a dedicated area 20 (41.67 %) ▶ Outdoors 16 (33.33 %) ▶ In the hallway 2 (4.17 %)
6. How do you prefer to spend your active break?	<ul style="list-style-type: none"> ▶ Mainly individually 4 (14.81%) ▶ Mainly in small groups with colleagues 6 (22.22%) ▶ Mainly in small groups, open to all (colleagues, superiors, administrators) 17 (62.96%)
7. The type of active break you prefer would involve: (Choose one option only)	<ul style="list-style-type: none"> ▶ Specific exercises (postural exercises, stretching, simple bodyweight exercises, yoga) 12 (44.44%) ▶ General physical activity (eg, walking, taking stairs, standing up periodically) 1 (3.70%) ▶ Combination of both 14 (51.85%)
8. What do you think is the most effective way to administer active breaks? (Choose one option only)	<ul style="list-style-type: none"> ▶ Managed by a qualified exercise scientist 11 (40.74%) ▶ Managed by a peer (colleague/superior) 4 (14.81%) ▶ Brief explanation by an exercise scientist followed by individual self-management 3 (11.11%) ▶ Brief explanation by an exercise scientist followed by group management 6 (22.22%) ▶ Self-managed using a workbook 1 (3.70%) ▶ Managed using an instructional video 2 (7.41%)

This highlights the need for interventions that create opportunities for activity and foster intrinsic motivation.³⁸ However, an insufficiently supported work context and a lack of assistance from academic leadership in implementing PA programmes may further exacerbate these individuals' non-participation. A study³⁹ found that up to 42% of university employees did not meet the recommended PA guidelines. Additionally, it highlighted that lower levels of PA were associated with reduced well-being scores.

Indeed, social influence has been found to play a critical role in ABs participation. Participants expressed concern about the negative opinions or indifference of others, particularly superiors and colleagues. Fear of being judged for taking breaks can significantly dissuade people from participating in programmes. This social pressure represents an important barrier, as workplace culture and peer attitudes can heavily influence individual behaviour.⁴⁰ A previous study examined the qualitative responses of participants who completed an

intervention consisting of 15 min PA breaks during the workday. Greater management support was identified as one of the barriers they encountered.⁴¹ Indeed, group cohesion and mutual support among colleagues emerge as crucial facilitators in ABs adoption. Participating in ABs as a group allows you to share experiences and mutual support and reduces the sense of isolation that can sometimes accompany working life. The study by Taylor *et al*⁴¹ highlighted that enhanced workplace social interaction was perceived as one of the benefit themes identified by participants who took part in a 15 min PA intervention in the workplace. Collective involvement in these activities not only promotes physical health, but also helps strengthen bonds within the working community, promoting a climate of collaboration and solidarity.⁴² A research conducted in an Italian university highlights the key role of social relationships in enhancing well-being.⁴³ This underscores the importance of addressing the social dimension to increase adherence to ABs programmes and ultimately improve perceived well-being.

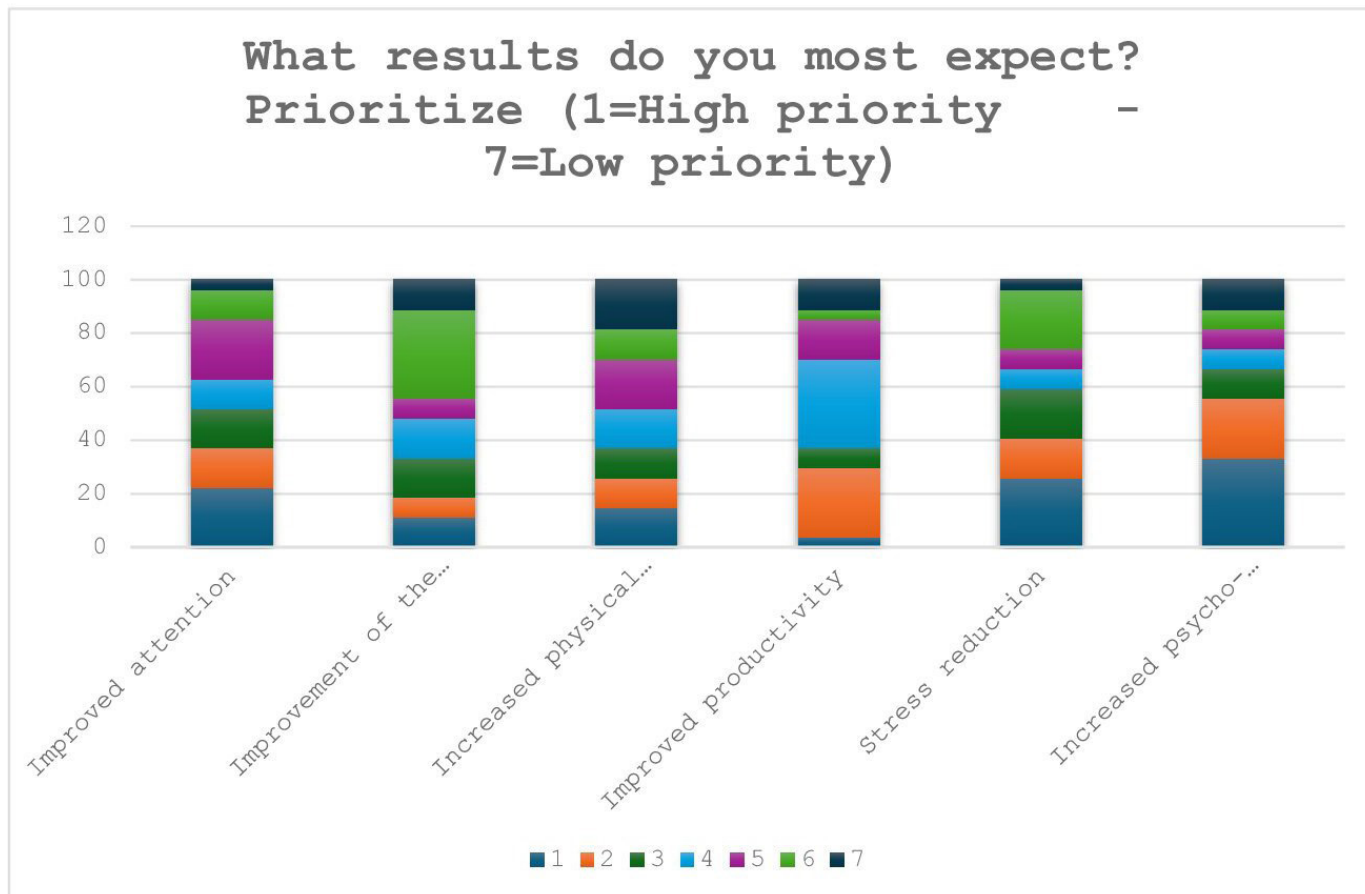


Figure 1 Result of question number 9: 'What results do you most expect?'

Lack of knowledge about ABs was also identified as a barrier. Some participants reported that they were not well informed about the benefits and logistics of ABs, suggesting that educational initiatives could be helpful. Providing clear information on the importance of PA and how to effectively incorporate ABs into the workday could mitigate this barrier and encourage more widespread adoption. A previous study aimed at co-producing a workplace intervention to break up sedentary time emphasised a clear lack of knowledge regarding the importance of interrupting sitting time.⁴⁴

Environmental factors further complicate the implementation of ABs. In fact, has often been cited by participants as 'inadequate physical spaces' or 'a work environment lacking green spaces'.

The presence of green spaces or open areas within the working environment can provide suitable locations for outdoor ABs, offering individuals the opportunity to carry out PA in a pleasant and stimulating environment. These green spaces not only promote PA, but also the general well-being of employees, offering a more welcoming and harmonious working environment.⁴⁵

Questionnaire

The results of the questionnaire conducted after participation in the FGs revealed several interesting trends.

The majority of participants identified as partially sedentary and active (48.15%); however, the majority of participants (81.48%) recognised that sedentary time in the workplace was a problem. This finding suggests a widespread awareness of the importance of combating a sedentary lifestyle during working hours. Scientific literature indeed confirms that the prevalence of sedentary risk factors is high among university campus employees.⁴⁶ Furthermore, the strong interest (92.59%) of participants in participating in workplace interventions to reduce sedentary time once again highlights the willingness of this group of participants to adopt more active and healthier behaviours. These results align with the programmes of the Sustainable Development Goals of the United National Organisation, particularly Goal 3, which aim to ensure healthy lives and promote well-being for all at all ages.⁴⁷ Within this goal, the importance of reducing physical inactivity levels is recognised as a key component for improving global health. Promoting PA in workplaces not only contributes to the physical and mental health of employees but can also increase productivity and reduce healthcare costs associated with chronic diseases linked to sedentary lifestyles. Therefore, the enthusiasm of participants for initiatives aimed at reducing sedentary time in the workplace reflects an alignment with these global guidelines and demonstrates how such interventions

can be well-received and potentially effective in the work environment. Furthermore, the preference to carry out ABs in small groups open to all (62.96%) also highlights the importance of social cohesion and support between colleagues in promoting ABs. This is in line with the previous discussion of group cohesion and mutual support among colleagues as key facilitators for participation in ABs.

Additionally, the results on the expected benefits of implementing ABs primarily highlight stress reduction and the improvement of physical and mental well-being. This underscores a growing emphasis on mental health and physical wellness in the workplace. In this regard, a recent study identified several key health and well-being issues among staff working in higher education institutions across 16 countries in the post-pandemic era. Many staff members reported experiencing burnout and moderate to high levels of psychological distress, highlighting the need to provide support, services and greater awareness of existing resources for these vulnerable individuals.⁴⁸ This highlights the importance of promoting targeted interventions to reduce stress and improve well-being of the academic working context, with ABs potentially serving as a useful strategy.

Recognising the importance of reducing stress and improving mental and physical well-being is essential for creating a healthy workplace. Implementing health programmes within universities or other workplaces can lead to numerous benefits, such as increased employee satisfaction, reduced absenteeism and overall productivity improvements.⁴⁹

In light of the identified barriers and facilitators to the implementation of ABs, the university setting offers a promising environment for introducing these interventions.

Work flexibility has emerged as a facilitator for the implementation of ABs. Given that work flexibility could be found in academic environments,³⁶ the university setting would be particularly well-suited for the implementation of ABs. Furthermore, scientific literature has emphasised the value of technologies. For example, the review by Perry-Moore *et al*⁵⁰ reported that reminders and alerts offer numerous advantages for patients, suggesting that automated technology may, for instance, reliably assist patients in adhering to their health regimens and improving attendance rates. Based on this, it could be hypothesised that such technologies might also enhance participation in performing ABs. University environments, thanks to the availability of institutional notification systems, could be particularly well-suited for the implementation of ABs, leading to more effective management. Additionally, the use of institutional drives could facilitate the sharing of content related to ABs, potentially increasing the spread of knowledge, participation and adherence to this type of intervention.

Moreover, it is essential for universities to acknowledge that every individual contributes to the well-being of the entire academic community. It is equally important to

engage representatives from all campus sectors to share a common agenda and collaborate on initiatives aimed at promoting well-being⁵¹ (among which we could include ABs, for example). A work environment that prioritises well-being could serve as an ideal setting for the implementation of ABs, as it would be the employers and supervisors who recognise the importance of such interventions, encouraging participation among all employees. Additionally, faculty behaviours and attitudes could potentially affect students, suggesting that they might play a crucial role in student learning.⁵² This underscores the importance of implementing an ABs intervention within the university environment, so that these practices can be adopted and disseminated, creating a positive impact not only on the academic community but also beyond and potentially contributing to the spread of knowledge related to these topics.

Regarding the environmental level, although the availability of green spaces could be helpful, it is important to emphasise that ABs are a form of intervention that can be easily integrated into the workplace, such as in an office or a university classroom. Moreover, ABs can be performed without the need for specific equipment or clothing, making the university setting also well-suited for the implementation of ABs. A previous study⁵³ explored the perspectives of employees and supervisors from different worksites on incorporating 10 min PA breaks into the workday. Supervisors commented that PA breaks could be a more feasible option for offering worksite PA compared with creating fitness rooms or regular fitness class programming, and they would be easy to coordinate.

Given these considerations, several potential directions for future research on ABs can be explored. First, it would be useful to design ABs so that they can be performed at any time during the workday, easily integrating into each worker's routine. For example, short-duration ABs (5–10 min) may be more easily accepted, as longer breaks could be perceived as too disruptive to the workflow, discouraging their implementation.

Additionally, implementing ABs through flexible modalities could encourage greater adherence. For instance, providing instructional videos that workers can access and follow at their convenience could encourage both individual and collective participation. To further facilitate adoption, ABs should consist of simple exercises that do not require special equipment, can be performed in any type of clothing, and in any work environment, even in small spaces without designated areas for PA.

Furthermore, integrating ABs with educational initiatives could be crucial in raising awareness of the risks associated with SB and the benefits of PA and ABs themselves. Finally, explicit support from supervisors and employers will be essential in promoting and sustaining these interventions within the workplace.

Limitation

Our study has several limitations that should be considered when interpreting the findings. First, the sample size

was relatively small and limited to only one Italian university, which may not represent the broader academic population, thus limiting the generalisability of the results. However, conducting qualitative research with large samples is often very difficult especially because each FG, to give space to all participants, must be conducted with a limited number of people. Moreover, it is important to underline that we conducted the FGs virtually, as opposed to the traditional face-to-face setting; however, we felt there would be no loss of information using computers to link into the groups. Of course, an intrinsic limitation of this type of study is represented by the fact that some participants may not feel comfortable reporting comments or opinions that are clearly in contrast with colleagues. This limit can partly be overcome by the skill of the moderator who has the task of maintaining a calm and open atmosphere throughout the FG. Finally, focusing on a specific academic environment may not capture the full range of barriers and facilitators in other workplace settings.

Conclusion

The present study identified barriers and facilitators to an ABs intervention from the perspective of administrative staff, residents and researchers. By addressing these barriers and leveraging the facilitators, institutions can foster a supportive environment that promotes PA, reduces SB and enhances overall well-being and safety of workers through an integrated and individual-centred approach. The results of this study could be implemented into the protocol for an intervention study based on the ABs for all workers. Further research with larger samples is recommended to develop targeted and broadly applicable strategies.

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