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Promoting wellbeing: A randomized controlled trial of the Five Ways to All intervention

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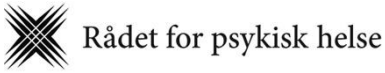


1. Excellence

1.1 State of the art

The need for effective, low-cost and evidence-based tools to prevent illness and promote health in the population is paramount. Norway, along with other countries in the Western world, is currently facing major health and welfare-related challenges. Demographic changes, lifestyle related diseases and work absence are threatening the sustainability of the Norwegian welfare state. Non-communicable diseases, including mental illness, currently account for 65% of the total disease burden in Norway[1] and 50% of Norwegians are likely to meet diagnostic criteria for a mental disorder some time during their life span[2]. Recent longitudinal studies even indicate the life-time prevalence of mental disorder to exceed 80%, underscoring the magnitude of these problems[3]. Low wellbeing (i.e., languishing), loneliness and disengagement constitute additional challenges to the health, welfare and employment systems, as well as to individuals, families and communities. One in four adults (i.e., > 900,000) in Norway reports low levels of mastery and coping[4] and 16.1% of adults (i.e., 700,000 individuals) report low satisfaction with life[5]. Persistent and increasing inequalities in health are also well-documented, and may negatively impact population health and society[6]. The recent covid-19 pandemic and subsequent financial crisis is likely to aggravate the burden of mental ill-health even further [7] and may also increase health-related inequalities both nationally and internationally. The total load of mental health related problems and compromised wellbeing thus constitutes a major and increasing threat to the society. Effective strategies to improve the health and work capacity in the population are therefore suggested to be the most important step towards a sustainable welfare state in the years to come[8].

How can we best address these challenges and contribute to reduce the disease burden? Traditional treatment and care options tend to be costly and time consuming, and to depend on highly skilled specialist human resources. Systematic findings also indicate that population-based (i.e., universal, targeting the general population) measures often result in larger population health gains than selective and indicated measures targeting only those with excess risk. According to the *paradox of prevention,* when disease risk is common, universal interventions directed towards the whole population *before* illness occurs, are more effective than interventions targeting high risk groups *after* symptoms have emerged [9]. Evidence also suggests that health promoting interventions that empower people to increase control over, and improve, their health may prevent more mental disorders than preventive measures directly targeting mental disorders. Furthermore, universal health promotive interventions tend to be less resource intensive and thus more cost-saving[10].

One particularly promising avenue within the health promoting perspective is wellbeing promotive measures. Wellbeing is a fundamental human value and defined as a UN Sustainable Development Goal[11]. In 2012, the General Assembly of the United Nations declared happiness a "fundamental human goal" and proclaimed the 20th of March the International Day of Happiness (Resolution 66/281), highlighting the international concern for happiness. An impressive scientific literature has also shown that wellbeing is systematically, and often prospectively, related to a wide range of important health-related and societal outcomes including social integration, innovation, work attendance and productivity, healthy behaviors, health (e.g., mental, cardiovascular and immunological) and longevity[12, 13]. A positive health perspective, focusing on promotion of wellbeing (e.g., positive emotions, engagement and positive relations), is therefore argued to be a good weapon against mental health-related problems worldwide[14].

The covid-19 pandemic and associated social distancing measures have corroborated the need for digital solutions. Web-based interventions may reach a large number of participants, utilizing a very modest amount of both human and financial resources. Of note, web-based wellbeing promotive measures have been relatively neglected in intervention research. An additional concern is the wide gap between the research, policy and practice fields that needs to be bridged[15]. Research on effective low-cost universal health promotive interventions conducted in close partnership with the policy and practice fields, are therefore highly warranted.

This study aims to test a potentially effective low-cost health and wellbeing promotive web-based intervention targeting the general population in Norwegian municipalities. The intervention is based on the *Five Ways to Wellbeing*[16] framework developed for British health authorities in 2008. This framework, and the intervention to be tested, provides participants with knowledge on simple, sustainable activities that may strengthen their subjective wellbeing (SWB), mastery, health and social relations, thereby also reducing the risk of common mental health problems such as depression and anxiety. The study will be conducted in close collaboration with municipal stakeholders and important user groups.

Why wellbeing and why wellbeing for all? Promotion of population wellbeing may lead to better mental and physical health, improved social integration, and reduced loneliness and work absence[17]. Why is this so? When people experience high levels of stress due to life challenges, and low levels of mastery, several processes come into play. One such process includes the stress hormone cortisol, which mediates effects on our immune- and nervous systems, resulting in inflammation, pain, anxiety and depression[18]. Increasing wellbeing, by helping people to engage in wellbeing promotive activities, does the opposite. The positive emotions elicited from every daily experience of e.g. mastery and good social contact, inhibit the stress-related cortisol-effect, through other hormonal pathways (i.e. works as an antidote to stress). This important fact, that wellbeing in *itself* may protect us from illness, and strengthen our coping capacity when facing illness or disadvantages, does not seem to be common knowledge. The health sector and related disciplines have traditionally been deficit oriented. The importance of general wellbeing to health was made explicit in The World Health Organisation's[19] definition of health as early as in 1948; "Health is a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity". Nevertheless, it is the absence of disease and infirmity that has received most attention by politicians and administrators in municipalities - and responsibility for health has mainly been placed on health care services. However, health and wellbeing are mostly built where people live their lives, in their context and through the daily activities they engage in. Along with structural interventions that focus on healthy living conditions for all, freedom and equality, wellbeing promoting measures empowering individuals and strengthen the positive protective factors are likely to enhance population wellbeing and mastery[20]. In addition to *illness preventive interventions,* which seek to reduce risk factors and to prevent specific symptoms and diagnoses, the municipalities also need *health promotive interventions*, which seek to strengthen general promotive factors for wellbeing.

Universal health and wellbeing promotion targeting the general population, including those with compromised wellbeing, recurrent common mental health problems and general low levels of mastery, may prove highly beneficial. As indicated by the prevention paradox, modest improvement in individuals may have a powerful impact at the population level. Figure 1 illustrates how small to moderate individual effect sizes (i.e., d=0.3) will have major effects on population level (i.e., reduce a prevalence of 8% by 3.5%). This example implies that in a population of 1 million, a universal intervention moving the distribution 0.3 *sd* in the positive direction would result in 35,000 fewer disease cases.

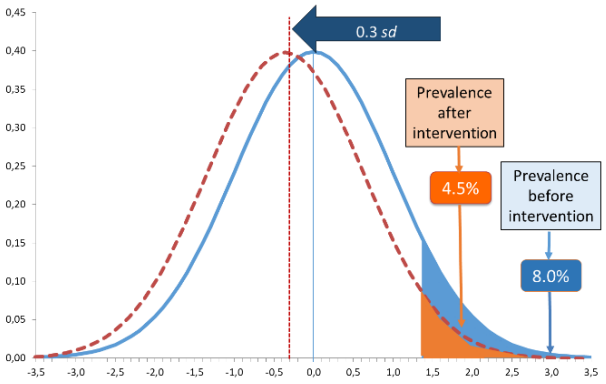


Figure 1. The population effect of public health measures with the effect size of Cohen's d=0.3.

Lack of research: The OECD report "Understanding effective approaches to promoting mental health and preventing mental illness" from 2017 concluded that there is a sound and quite extensive evidence base for effective and cost effective actions to promote mental wellbeing and prevent mental ill-health[21]. There are, however, few studies on ways to enhance wellbeing in the general population, and especially through web-based universal interventions. A few meta-analyses have been published, showing that face-to-face delivered positive psychological interventions are effective in improving wellbeing, with effect sizes of Cohen's d in the range of 0.2-0.3. Sin and Lyubomirsky[22] concluded in their meta-analysis that positive psychology interventions significantly enhance wellbeing (mean r=0.29) and decrease depressive symptoms (mean r=0.31). A later meta-analysis by Bolier et al. in 2013[23] showed that the standardized mean difference was 0.34 for SWB (life satisfaction and positive affect), 0.20 for psychological wellbeing (PWB [optimal functioning in terms of e.g. mastery, hope, purpose in life]) and 0.23 for depression. Both meta-analyses indicate small, but significant effects for positive psychology interventions. A more recent review and meta-analysis, testing multi-component positive psychological interventions in both clinical and non-clinical samples, reported standardized mean effects of 0.34 for SWB, 0.39 for PWB, 0.29 for depression and 0.35 for anxiety and stress, indicating small to moderate effects[24]. Another recent meta-analysis looked at the effects of a wide range of RCT studies on positive psychology intervention targeting non-clinical population. This meta-analysis included both interventions using technology-assisted methods and traditional methods

(face-to-face). Results showed that positive psychology interventions increase wellbeing. The overall effect size was 0.23; 0.08 for PWB, 0.22 for SWB, and 0.43 when the studies targeted both types of well-being. Interventions based on traditional methods were more effective than those that used technology-assisted methods. However, technology-assisted interventions were effective too (0.27). This meta-analysis conclude that it is a lack of empirical studies with a aim to understand the success of wellbeing interventions via technology[25].

Of note, a critique of previous meta-studies on positive psychology interventions argues that many of the studies' designs were not optimal (i.e., few were RCTs), the sample sizes in many of the included studies were too small, and that the actual effect sizes probably are somewhat smaller than previously reported estimates[26].

For the present study, findings from studies using web-based solutions are of special interest, with its amazing potential for broad outreach and inexpensive implementation. A search of systematic reviews and meta-analyses in Ovid Medline, Ovid Embase, Ovid APA PsychInfo, Web of Science, Cinahl, Cochrane Library, CRD-database and Epistemonikos, combining the search words *web-based interventions* with the terms *wellbeing*, *health promotion and prevention*, was conducted as preparation for the proposal to Stiftelsen Dam in spring 2020. The search resulted in 203 published articles. Very few of these reviews were highly relevant to our study. Most studies investigate effects of web-based interventions aiming to enhance wellbeing in specific clinical target groups, like cancer patients, individuals with chronic diseases and their caregivers. A few reviews were more relevant, targeting employees, students, and older adults. Web-based wellbeing promotive interventions in the workplace have been found to have significant positive effects on both psychological wellbeing (0.37) and work effectiveness (0.25) [27]. A review of digital mental health interventions for depression, anxiety, and psychological well-being for college students, concluded that the majority of programs were either effective (0.42, 47%) or partially effective (0.30, 34%)[28]. Furthermore, a systematic review and meta-analysis on computer-delivered interventions aiming to improve depression, anxiety and psychological wellbeing in university students reported lower levels of anxiety (-0.56), depression (-0.43) and stress (-0.73) post intervention[29]. A recent review exploring the effectiveness of technology-based interventions in promoting mental health and wellbeing of older adults (≥40), reported positive effects on mild to moderate mental health problems[30]. Summed up, research in the field of health promotive and illness preventive interventions, both digital and non-digital, with the aim to improve wellbeing, concludes that more research on the question of causality is needed, along with high quality study-designs (i.e., RCTs), and larger sample sizes. This study will address these important needs.

A universal wellbeing tool: The Five Ways to Wellbeing is a promising health promotive framework. It resulted from a UK government project aiming to identify the five action domains most closely related to wellbeing and mental health. More specifically, the UK Government Office of Science commissioned the New Economics Foundation to conduct a comprehensive review of the academic literature on wellbeing, as part of the Foresight Programme on Mental Capital and Wellbeing in 2008. The five ways to wellbeing were to parallel the 5 A DAY campaign to health recommended by the World Health Organization (WHO), which encourages consumption of five portions of vegetables and fruits per day. The Five Ways to Wellbeing were to be relevant for people in all ages, universal, evidence based, and possible for people to integrate in their everyday lives[16]. The resulting Five Ways to Wellbeing included the following five action domains: 1) To **connect -** social relations are essential for promotion of wellbeing and for prevention of mental health problems in all age groups[31], 2) to **be active -** regular physical activity is associated with wellbeing and less depression and anxiety in all age groups[32], 3) to **take notice -** research shows that being attentive to what is happening in the moment directly promotes wellbeing[33], 4) to **keep learning -** life-long learning has a positive effect on wellbeing and resilience[34], and 5) **To give -** wellbeing is strengthened by prosocial behavior and when people are feeling a sense of meaning and that they are contributing to the society. To give, share and help, is associated with positive feelings and the feeling of being worth to others[35].

There is an academic evidence base for each *individual* action domain in the Five Ways to Wellbeing, but still a lack of research on the combination of all five actions. A recent study from New Zealand, including 10,000 participants, examined the relationship between engaging in the Five Ways to Wellbeing-actions and level of wellbeing. Results showed that all five actions correlated positively and significantly with wellbeing. The results also showed that the more of the five activities individuals were doing regularly, the higher levels of wellbeing were reported. These results provide strong support for the Five Ways to

Wellbeing model as health promotive, but the cross-sectional study could not determine causality[36]. To determine causality, intervention studies, like the current project, are needed.

In Norway, the Five Ways to Wellbeing concept has been developed into a course format by the Norwegian Council for Mental Health (NCMH) in collaboration with the Norwegian Institute of Public Health (NIPH), the Norwegian Directorate of Health, and user representatives. This *Five Ways to Wellbeing-(Hverdagsglede) course,* which is currently being implemented in Norwegian Healthy Life Centers (HLC) (*Frisklivssentraler*) targets individuals who need support in health behaviour change and in coping with established health problems and chronic disease. A pilot study (n=116) showed highly promising results for the effects of the HLC intervention[37]. The current study will investigate the effect of a *condensed* and *digital* form of this Five Ways to Wellbeing course, developed to be less resource intensive and suitable to reach large groups of the general population.

The aim: We aim to test a 10 week web-based Five Ways to Wellbeing-intervention targeting the general population, called *5Ways for All (5WaysA)*. The intervention will consist of a two hours main webinar, a booster session webinar four weeks after the webinar, and SMS messages twice a week over a period six weeks. Thus, we will investigate effects of a low-cost health and wellbeing promotive public health tool based on the evidence-based Five Ways to Wellbeing. To date, nobody has tested the Five Ways-concept in such a format. Proved effective, this web-based *5WaysA* intervention, may have a significant impact on the public health of inhabitants in the municipalities.

1.2 Novelty and ambition

The 5WaysA represents a novel wellbeing promotive measure. Although the Five Ways messages have been widely used by diverse organizations as a set of heuristics or rules of thumb, they have *not* been formed into a web-based intervention until now. The 5WaysA intervention is innovative and the planned research strategy highly ambitious, including a high-quality research design, a large sample size, and a highly skilled research team collaborating closely with important user groups.

Several low threshold mental health courses are available in the municipalities (e.g., the *Coping with Depression* and the *Coping with Strain* courses)[38], but focus on symptoms already in place, thus reaching individuals further along their way towards illness. The 5WaysA takes a contrasting approach by equipping those well-functioning or struggling, with strategies to maintain and strengthen wellbeing and positive relationships. The intervention has a broader scope than most interventions in current use and provides tools and methods designed to internally resource and empower individuals. The participants are provided with a "toolbox" of practical exercises that may be tailored to their individual needs and incorporated into their everyday lives. Positive psychology interventions have been found effective in fostering resilience, enhancing wellbeing and in reducing symptom levels[22, 23, 24, 25, 26, 27, 28, 29, 30]. The Five Ways to Wellbeing has the potential to be an universal tool, easy for people to integrate in their everyday life[39]. Few of the current measures found to be effective target the general population using a digital format. The current project will create a solid basis for implementation and testing of intervention impact.

The knowledge of universal interventions' superiority to selective and indicated interventions in providing population effects has existed for decades. Structural universal public health measures, like mandatory use of seat belts and the tobacco act, have had enormous health effects. Being low-cost and easy to implement, the modest 5WaysA intervention enables broad implementation, reaching large population groups and may remove the stigma of mental health services, improve health and promote resilience among participants. Universal interventions are often characterized by being cost-effective and yielding large population effects, the return on investment is therefore likely to be high.

An honest supply-and-demand assessment of mental health services given the total disease burden leads to the conclusion that face-to-face treatment needs are impossible to meet. In search for tools that can reach large groups of the population, it is legitimate to investigate modern technology and web-based solutions. The recent pandemic has shown that digital tools may be of great benefit in crises and highly useful more generally. Of note, knowledge on web-based solutions in public health work is needed[38].

Person-centredness is essential to intervention success, improved health and quality of life[40]. The 5WaysA include broad action domains that individuals are invited to tailor and fit to their personal preferences and needs. Thus, the intervention builds on the individual differences perspective and the importance of measures to allow for person-activity fit[41]. The 5WaysA intervention is targeted at the individual level, yet its benefits are oriented toward both the individual, relational and societal levels.

The five actions are likely to be relevant across all sectors and settings. Building on an understanding of the interconnection of psychosocial stress and physical and mental health, the 5Ways course represents an innovative approach compared to the traditional medical separation of somatic and mental health. A number of health problems arise as a result of exposure to chronic stress, and positive emotional experiences have been shown to reduce stress and prevent ill-health[4]. The simplicity of the Five Ways messages, though thoroughly grounded in scientific research, makes the messages available universally across socioeconomic status, culture, religion, age and gender. The project's ambition is to provide municipalities and other stakeholders with a good decision basis for future public health priorities and policy development, by contributing with comprehensive scientific knowledge on a promising measure to address urgent welfare problems including disease burden and work absence[37].

1.3 Research questions and hypotheses, theoretical approach and methodology

Main hypothesis: The web-based intervention 5WaysA will improve wellbeing and mastery and hence provide the municipalities with an effective measure for mental health promotion.

Research questions:

1. *To what extent does participation in the web-based 5WaysA intervention lead to improved wellbeing, mental health and mastery in the general population?*
2. *To what extent are the effects short-term and long-term (i.e., 10 weeks and 12 months)?*
3. *What mechanisms explain potential improvements in wellbeing?*
    a) *For whom is this intervention effective (i.e., is the effect moderated by e.g. gender, age, education)?*
    b) *What mechanisms (e.g., regular practicing of 5Ways actions, increased social activity or support) explain intervention effects?*

Sample: The sample consists of participants from the general population in Norwegian municipalities. A cooperation with public health alliances in the Viken and Trøndelag regions, as well as Sunne kommuner, the Norwegian WHO Healthy Cities network, has already been established. Public health coordinators in all of the municipalities will be involved in recruitment. Invitations to participate will be distributed via emails, the municipalities' web sites, social media, local newspapers, citizen panels (e.g., *Innbyggerpanelet* in Bærum) and related means. We plan to recruit a minimum of 1500 participants. The participants will be randomized to either an intervention group (n=750) or one of two wait-list control groups (active control group, n=375) (passive control group, n=375), receiving the intervention five months later. Citizen panels, like the one we will recruit from in Bærum, invites inhabitants to contribute with experiences and opinions about their lives in the municipality and about municipal services. The citizens' opinions contribute to new understandings, new ideas, innovative solutions and development. All participating regions and networks involved in our study have a strong tradition for involving the citizens in their work and have implemented wellbeing in their regional strategies.

Intervention: The intervention, 5WaysA, is a modified and shorter (10 weeks) web-based version of the original Five Ways to Wellbeing course[39]. The modification has been prepared in collaboration with the Norwegian Five Ways concept developer, the NCMH. The intervention consists of a two-hour main webinar with live lecturing from a facilitator introducing the Five Ways to Wellbeing framework and teaching the participants how to implement the five health promotive activities in their lives, a booster session webinar four weeks later, as well as two SMS messages every week for six weeks. Each SMS encourages participants to engage in one of the five activities, register activities/goals and queries about the degree of participation in the activity introduced in the previous SMS.

Pilot study (2020): To test the intervention before broad-scale implementation, we have run a small pilot study with participants from the Panel for Citizens in Bærum. The aim of this pilot study was to test the digital platform, train the facilitator in conducting the intervention, and optimize implementation. Participants in the pilot have been invited to provide feedback on the execution of the intervention, and this process has been very helpful in planning this study.

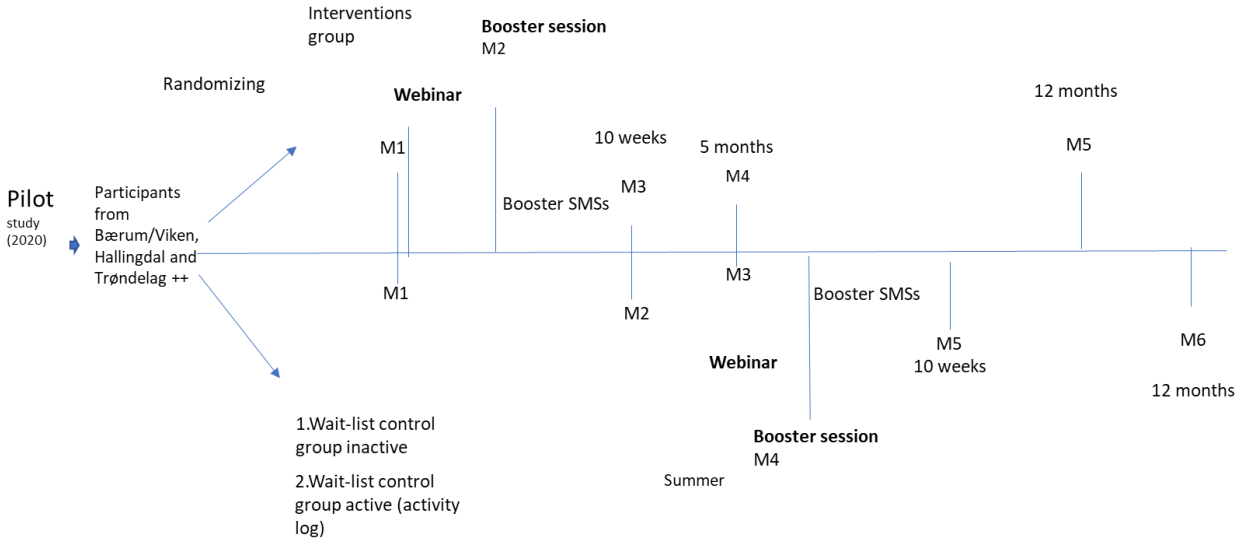


Figure 2 Time line

Design: The design is a randomized controlled trial (RCT), with one intervention group and two wait-list control groups. The goal with this design is to demonstrate the initial efficacy and feasibility of the 10 week 5WaysA intervention. We choose an RCT with two wait-list control groups, where one wait-list is writing activity log and the other is passive while waiting. We add the active control because we are aware of the limitations in passive wait-list control group conditions. However, both wait-list control groups will know they are waiting for an intervention, which can in turn produce demand characteristics. The intervention group will receive the 5WaysA intervention within a few weeks after announcing their interest in participating in the study. The wait-list control groups will receive the 5WaysA intervention 5 months after the intervention group had the intervention. The active wait-list control group is encouraged to write an activity log every week. The passive wait-list control group is not getting any tasks while they are waiting, other than a questionnaire. Figure 2 shows the time line for recruiting, randomizing and the schedule for intervention and measurement points (M).

Power analysis: We assume that we can recruit a minimum of 1500 participants, but high drop-out is expected. An a priori power analysis was conducted using G*Power3[40] to test the interaction effect in a mixed ANOVA, using a two-tailed test, assuming a small effect size (f = .10), and an alpha of .05. The assumed effect size (f=0.1) was chosen as it is of the same magnitude (lower bound) as has been reported by other universal interventions with wellbeing as the outcome measure[41]. The result showed that if we attained a total sample of 750 participants at our second measurement point (attrition of 50 %), we would have power of .999 to detect a group by time interaction. The high level of statistical power will enable us to investigate both moderators and mediators.

Measurement: Wellbeing is the primary outcome of this study. Comprehensive work has recently been published with recommendations for standard wellbeing measurements in Norway[42]. We will use the recommended shortlist which includes 23 questions on different aspects of quality of life (e.g., life satisfaction, positive affect, meaning, social wellbeing, negative affect) and background variables. The shortlist has been included in the Public Health Surveys in the counties and several other studies, and data has been collected from more than 100,000 individuals in 2019/2020. In addition, we will use the Satisfaction With Life Scale (SWLS), one of the most common wellbeing instruments globally (measuring subjective wellbeing, including global life satisfaction, cognitive and affective evaluations of life) with excellent psychometric properties[43]. We will also use a brief 8-items Flourishing Scale suitable for a general population (measuring psychological wellbeing, including self-perceived success in important areas such as relationships, self-esteem, purpose, and optimism)[44]. In addition, we will use five questions from Pearlin and Schooler (1978) Mastery Scale which measure a general attitude of the possibility to influence once life situation[45]. Secondary outcome measures include mental ill-health. To measure symptoms of depression and anxiety we will use the Symptom Checklist-8 (SCL-8), a short-form version of the original

SCL-25 with solid psychometric properties[46]. These instruments are commonly used in similar studies, making the results comparable to existing research findings[36]. We also add two questions from The Short Form Survey-12 (SF-12) to have a measure for physical health. The average time to complete the questionnaire is 10 minutes. In addition to the questionnaire, we will measure the participants' compliance in incorporating each of the five actions into their daily life. This will be assessed via replies to the weekly SMS messages.

Procedures: The webinar will be a live lecture with an independent trained facilitator. Questionnaires will be administrated and distributed by the project manager using the Nettskjema and Services for sensitive data (TSD) tools. The measurements for the intervention group will be conducted when the participants register to participate (baseline, just before the main webinar) (M1), at the booster session webinar one months after the completed main webinar (M2), 10 weeks after the main webinar (M3), five months after the main webinar (when control groups are starting) (M4) and 12 months after the intervention is completed (M5). Control groups will be measured when the participants register to participate (baseline, just before the main webinar) (M1), when the interventions group has completed the intervention (M2), when they start the intervention (main webinar) (M3), at the booster session one months after the completed main webinar (M4), ten weeks after the main webinar (M5) and 12 months after the intervention is completed (M6)

Data analysis: The effect analysis will involve a comparison of self-reported wellbeing at different measurement points, using a two-way mixed measures ANOVA. In addition, we will run a longitudinal analysis using linear mixed (multilevel) models on the data from all five measurement time points. Mixed modelling is a flexible way to handle unbalanced data in case of non-registration and repeated observations. The models allow us to investigate the effects of the intervention and test the hypotheses of group and individual development in wellbeing while controlling for both stable and time-varying covariates.

Ethics and privacy: All the participants will receive a letter of information about the study, also specifying the requirements of The Regional Committees for Health Research Ethics (REK). A written consent from all participants in all groups will be obtained. All sensitive personal information will be handled according to GDPR requirements. Data will be stored and analyzed under the Services for sensitive data (TSD) at UiO. The study will be preregistered in Open Science Network/Clinicaltrails.gov.

Risks: There is a low probability that this study leads to any disadvantage, damage or risk for the participants. The activities they are encouraged to engage in are universal, general and easy to adapt to differences in age, culture, socioeconomic background and state of health.

Risk	Consequences	Planned measures
Difficulties recruiting enough participants	Not enough participants can lower the statistical power of the study	Use of well-known, trusted institutions (e.g. public health coordinators) to recruit participants). Easy accessible information so that it is clear what participation entails.
Selection in recruitment	Effects are not generalizable	Ensure good and easy accessible information for people with different socioeconomic backgrounds, ages, gender and cultures. Get user panel feedback before submitting the information.
Too comprehensive questionnaires	May increase drop out	Use of short and simple questionnaire (10-12 min). Get user panel feedback on the questionnaire.
The sample size is too small to establish statistically significant effects. (i.e. [47])	Real effects can be camouflaged or not detected	Use large enough sample to get enough power to detect even small effects. Small effect for many individuals, means large effect on population level [9] (see Figure 1)

2. Impact

2.1 Potential impact of the proposed research

According to the Norwegian Public Health Act, municipalities are obliged to work systematically with health promotion and illness prevention[48]. An investigation conducted by the Office of the Auditor General of Norway in 2015 revealed that mental ill health is the largest health challenge for Norwegian municipalities, that there is too little focus on systematic health promotion, and that the lack of research on evidence based interventions makes it difficult to make decisions and choose actions[49]. In trying to fulfil the law requirements, the Norwegian government and municipalities continuously search for "what works" when planning interventions aiming to promote health and mastery. Low-cost and evidence-based health promoting public health tools, are urgently needed in the Norwegian municipalities.

There is similarly a need for high quality intervention studies, using randomised controlled trials and multiple assessments, so that causality can be established. There is also an urgent need for more research on web-based interventions, especially in the light of the pandemic of Covid-19 and potential future crises that require social distancing. This study will improve the knowledge foundation needed for making priorities and decisions regarding effective health promotive interventions. In addition, the project has the potential to become an important and highly warranted bridge-builder between academic research and the practice field in the municipalities. The study will highlight core barriers that exist in these types of cooperation, but also point out the criteria for success when the cooperation is working, and useful research is produced.

Increasing the general population's wellbeing is essential to keep people healthy, well and able to work. As an overreaching goal this project seeks to find ways to contribute to better health and wellbeing among Norwegians, but also internationally if utilized in other counties. Our study therefore addresses The United Nations' Sustainable Developmental Goals (SDGs) goal #3: "Ensure healthy lives and promote wellbeing for all at all ages". In addition, our study may have the potential to keep people at work/in training and may in this way stimulate to both economic growth and the reduction of social inequalities. Thus, the study also addresses also the UN's SDG #8: "Decent work and economic growth" and SDG #10: "Reduced inequalities".

2.2 Measures for communication and exploitation

Several users and stakeholders are of relevance to this study, including the general population, local politicians and the municipality administrations. Scientific findings will be disseminated through research communication channels like international open access journals in the fields of public health, wellbeing, psychology and internet-based solutions. The results will also be presented at national and international conferences and seminars. Findings from the study will be made available for all interested stakeholders in the municipalities in Norway, the general population, national health authorities and the media. We will use local newspapers, central authorities in the municipalities and local as well as national seminars to spread the results. The NCMH, the research team at PROMENTA Research Centre and The Norwegian Institute of Public Health (NIPH), will actively participate in the communication by publishing on their web-pages to make findings easily available to researchers, authorities, journalists and the public. Newspapers and social media, such as Twitter and Facebook, will be used actively. PROMENTA has a communication unit headed by Sunne kommuner, the Norwegian part of the WHO Healthy Cities Network, with a broad national and international outreach to important stakeholders. Distribution of our findings will also be supported by the information and press departments of at the UiO and the NIPH and distributed via their websites, newsletters and social media to reach a large audience. The NIPH currently has more than 100,000 followers on Facebook and 26,000 on twitter. Web statistics show 30 million page views during the first quarter of 2020.

The NCMH is our main cooperating partner in this project. The council has a special interest in research on universal interventions, targeting the general population. They will also be interested and active in the communication of the results from our study to other municipalities in Norway, in their continuous work advising local decision makers to the promotion of wellbeing and prevention of health problems. The Public Health network in Viken and the Alliance for Public health in Trøndelag will actively communicate the research finding in their networks.

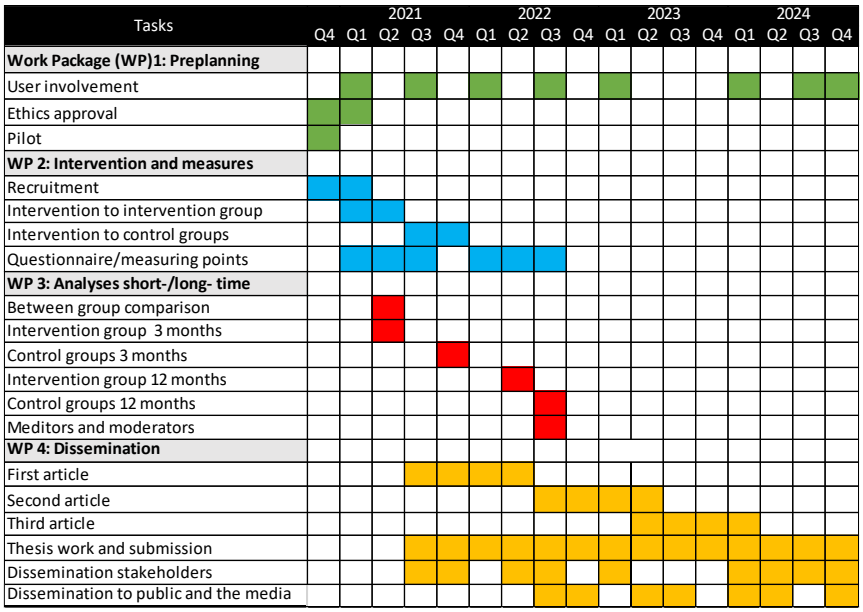
3. Implementation

3.1 Main researcher and project group

Clinical Psychologist, and specialist in public health psychology, **Monica Beer Prydz** will be the principal investigator and PhD candidate. Prydz has long-term experience from the HLC setting and currently works as a project manager on a public health project at a HLC in Bærum municipality. She is also leading courses for psychologists within the field of public health and lecturing in the theoretical and practical field of public health. Prydz is also supervising psychologists who are working in different municipalities in Norway. **Ragnhild Bang Nes**, psychologist, PhD, senior scientist at the Department of Mental and Physical Health (DMP), NIPH, and associate professor at the Department of Psychology at the UiO, will be the main supervisor in this project. Nes is a profiled and award-winning researcher in the field of wellbeing and has contributed in the development of the intervention. Nes will be heading the intervention research group at PROMENTA research centre, where the planned project will play a significant role. Professor **Espen Røysamb**, psychologist, PhD, is the head of PROMENTA and will be co-supervising the candidate. Professor Røysamb has extensive experience from wellbeing and mental health research, excellent

methodological skills and has previously supervised more than 30 PhD students. **Nikolai Olavi Czajkowski**, psychologist, PhD, associate professor at UiO and senior scientist at NIPH, will also be co-supervisor to the PhD candidate. Czajkowski, who is heading the methodology research group at PROMENTA, will particularly contribute with his highly regarded expertise in statistical methods and research design. **Maja Eilertsen**, MD, PhD candidate at the DMP, NIPH, will cooperate closely with the candidate. Her PhD-project is linked to the proposed project, studying a related course-based FiveWays intervention aimed at a different target group. Key international collaborators include Professors **Terrie Moffitt** and **Avshalom Caspi** (Duke University/King's College/UiO). Moffitt and Caspi are part time employed in PROMENTA, are world leading experts in mental health, human development and prevention of adult mental health problems, and will bring outstanding competence into the project.

An **advisory board** comprising of high expertise researchers and representatives from the user panel will provide supervision and guidance for the project group. The advisory board consists of **Dina von Heimburg**, public health coordinator in Levanger municipality and contact for WHO healthy cities network, **Hilde Nysæther Franztsen**, public health coordinator in Ål municipality, **Ingvild Little**, leader of Sunne kommuner, the Norwegian part of the WHO Healthy Cities Network, Associate Professor **Egil Nygård** at UiO, **Dora Gudmundsdottir**, Director of determinants of health and wellbeing at the directorate of health in Iceland, **Werner Fredriksen**, senior advisor and responsible for the implementation of the Five Ways- concept in NCMH and members from user panel.



3.2 Project organisation and management

To ensure sufficient time for data collection, the PhD project is scheduled over 4 years, starting in January 2021, and ending in December 2024.

Essential infrastructure in this study will be the survey tools Nettskjema used for distributing the questionnaire to the participants, data handling and data storage. The agreements with the suppliers are already in place. UiO will provide other essential tools, like statistical programs and other research tools. Regular meetings with the user panel, an advisory board and the NCMH are regarded as essential resources in this project. Prydz will be the coordinator in all work packages (WP 1 to 4), cooperating with municipalities, the user panel and the research group. The research group will collaborate closely with the NCMH, who will be involved in the planning, the intervention, and in the research process, as well as contributing to dissemination of study findings. The user panel will consist of a representative sample of inhabitants from the regions involved. They will be involved in planning and organizing the study, including providing feedback on the content and technical solution of the intervention and the questionnaire. We will be in close dialog with this user panel before, during and after the planned study. The participants in the panel will get the opportunity to attend to the webinar and answer the questionnaire (without being part of the study) to be able to give feedback on all aspects of the intervention.

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