

Experience and Impact of the “Well-Track” Physical Activity and Sleep Tracker Based Healthy Lifestyle Intervention for Patients in an Early Intervention in Psychosis (EIP) Service

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Abstract

Background: Physical activity and sleep are interconnected with mental health, physical health, wellbeing, quality of life, cognition, and functioning. Compared to the general population, people who experience psychosis are more likely to have low levels of physical activity, high levels of sedentary behaviour, and sleep problems. **Intervention:** The Well-Track intervention addresses these issues through: provision of a wearable activity and sleep tracker (Fitbit); physical activity and sleep hygiene advice; a brief motivational interview; a goal-setting workbook; and three engagement, feedback and discussion sessions with early intervention in psychosis (EIP) staff. **Participants:** Thirty participants using an EIP service took part in an eight-week intervention. Thirteen participants (6 males; 7 females) with an age range of 18 to 61 years old ($M = 28$ years) took part in an interview. **Methods:** A qualitative approach was used to conduct in-depth semi-structured interviews. Thematic and content analyses were employed to analyse the data. **Results:** Participants set goals, made lifestyle changes to their daily routine and integrated a Fitbit and its functions into their lives that resulted in more physical activity and enabled more effective sleep. This resulted in improved self-management, positive feelings and thoughts, motivation, confidence, social engagement, mood, health, and wellbeing. Participants made progress towards goals they had set. **Conclusion:** Well-Track has been successfully integrated into an EIP service and it could be delivered through all EIP and other healthcare services where there is a need to promote healthy lifestyle behaviours.

Keywords

Fitbit, Tracker, Psychosis, Exercise, Sleep, Wearables, Activity

1. Introduction

The prevalence of a psychotic disorder in England is 0.7% of adults aged 16+ (Public Health England, 2016). Compared to the general population, levels of physical activity are lower in people who experience psychosis [1] [2] [3] [4]. Lower levels of physical activity are linked to more depressive symptoms, lower wellbeing, greater hopelessness, lower quality of life, and increased risk of physical health diseases, such as cardiovascular disease (CVD), stroke, hypertension, osteoarthritis, diabetes, and chronic obstructive pulmonary disease (COPD) [5] [6]. Lack of physical activity and poor quality of sleep are contributory factors to the reduced life expectancy in schizophrenia (14.5 years less than the general population) [7]. The National Clinical Audit of Psychosis (NCAP) identified that 46% of patients with psychosis required intervention for weight gain or obesity [8]. Within three months of commencing antipsychotic medication, patients (and in particular young patients) can experience rapid increases in body weight [9]. Weight gain is a cause of distress, reduced self-worth, poor sleep, and less physical activity [10] [11]. People with experience of psychosis are likely to have smaller social networks than the general population and this is also linked to worse symptoms [12].

Psychological barriers to commencing and maintaining physical activity include psychotic symptoms, anxiety, low motivation, and low self-efficacy [13] [14]. Additional barriers include social withdrawal due to poor mental health, stigma, fear of others, and low self-esteem [14]. There can be practical issues and barriers to adopting a healthy lifestyle too, such as cost, time, and insufficient skills and knowledge [14]. People need to recover not only from mental health problems but from social exclusion, loss of friendships, loss of meaningful activities and psychological factors such as a loss of self-efficacy, self-confidence, self-respect, sense of self, hope, and motivation [15].

Sleep problems are common in people with symptoms of psychosis (with rates of 80% reported) and impact negatively on functioning and wellbeing [16] [17] [18]. Patients with recent experience of delusions and hallucinations report problems getting to sleep, staying asleep, experiencing too little or too much sleep, nightmares, and erratic sleep patterns [19]. Poor sleep in people with a psychosis diagnosis is associated with reduced quality of life, increased suicide risk, cognitive impairment, and worse functioning and symptoms [17] [20] [21] [22] [23] [24]. Insomnia is associated with psychotic experiences [25]; and severity of sleep disturbance and sleep-related impairment is associated with greater negative symptoms across motivation-pleasure deficits and diminished expression [26].

Poor sleep initiation has a negative impact on social and occupational functioning [27]. Patients experiencing delusions and hallucinations report that sleep problems can cause emotional distress and fatigue, and a reduction in daytime activities and capacity to cope with distressing hallucinations (such as hearing voices) [19]. Patients with recent delusions and hallucinations report that psychotic experiences are negatively associated with effective sleep, and that the

consequent tiredness due to poor sleep means that they cope less well with hallucinations and persecutory fears [19]. Patients experiencing delusions and hallucinations have described a bidirectional causal relationship between poor quality sleep and psychotic experiences [19].

Early intervention in psychosis (EIP) services provide regular physical health checks, monitoring and appropriate treatment [28]. It is recommended that services offer physical activity programmes [28], but there is a lack of effective physical activity interventions in EIP services [29]. Individualised exercise and healthy lifestyle promoting interventions in first episode psychosis have been shown to be effective in improving symptomatology, functioning, and physical well-being [30] [31]. Actively using a Fitbit can significantly increase physical activity, self-awareness, motivation and goal setting, and reduce body weight [32] [33]. Qualitative research of a wrist-located activity and sleep tracker (Fitbit) based intervention (that provided sleep hygiene, physical activity and exercise advice, and three engagement/support/feedback sessions) in early psychosis found that most participants actively used the Fitbit and its software apps and sessions to gain information, feedback, awareness of healthy lifestyle benefits; this facilitated greater motivation and enabled goal setting to achieve changes to their lifestyle and daily routines to improve quality of sleep, levels of physical activity, and exercise [34] [35] [36]. It was found that the intervention and Fitbit/app data, information, and objective feedback increased physical activity, and promoted effective sleep, wellbeing, adoption of technology (which supported healthy lifestyle behaviours), and reduced levels of depression [34] [35] [36] [37].

For this project the Well-Track intervention was enhanced by the addition of a brief motivational interview and a goal-setting workbook. This study sought to identify how Well-Track interlinked with the real-world experiences of patients to enhance physical activity, effective sleep, health and wellbeing. The evaluation question was: “What was the experience and impact of Well-Track?”.

2. Methods

2.1. Participants

The sample was recruited from people using an EIP service within a United Kingdom (UK) National Health Service (NHS) Trust. Participants were included if they were aged 16 or over, had the mental capacity to consent, provided informed consent, and had the ability to understand verbal English. Out of thirty participants, thirteen (6 males; 7 females) with an age range of 18 to 61 years old ($M = 28.15$; $SD = 11.75$) took part in an interview. Participants identified themselves as: White British ($n = 7$), White European ($n = 3$), Black British ($n = 1$), Asian British ($n = 1$), Unknown ($n = 1$).

2.2. Setting and Intervention

The intervention was implemented whilst participants were under the care of the EIP service. In this service every person is offered a National Institute for Health

& Care Excellence (NICE) concordant package of care and treatment as per national standards (NICE, 2016). Goals of the service related to key performance indicators (KPIs) include: reducing weight gain; improving wellbeing; reducing symptoms of psychosis and impact of those symptoms; improving physical activity; enabling better self-management; and enabling healthier lifestyles.

Thirty EIP patients were offered an eight-week intervention which incorporated the provision of a brief motivational interview and completion of a goal-setting workbook with an EIP staff member, a free to keep Fitbit (specific model: Fitbit Charge 4), sleep hygiene and physical activity information sheets and verbal advice, and three patient engagement, feedback and discussion sessions with an EIP staff member.

2.3. Procedure

The project was undertaken from summer of 2022 to spring of 2023. Approval for the study was gained from the NHS Trust in which the service was based on 29 March 2022. EIP service staff reviewed patient notes to check eligibility prior to providing patients with a participant information sheet (PIS). Sampling was non-probabilistic, accessible, and purposive to achieve a representative sample in terms of age and gender. Semi-structured interviews were carried out via phone or video call. Informed consent was gained from all interviewees, and they were advised of their right to withdraw at any time. Following transcription, all transcripts were anonymised, and the audio files were deleted. Interview duration averaged 32.29 minutes (range 23.28 - 46.15 minutes).

2.4. Methodology and Analysis

Content analysis was conducted on five interview questions. For four sets of answers percentages were calculated and answers for all five questions were reviewed to provide representative and illustrative quotes.

Thematic analysis was carried out using the following procedure based on Braun and Clarke's work [38]. Firstly, the researchers familiarised themselves with the material by reading and re-reading the transcripts. Secondly, initial codes were generated line-by-line by three researchers working independently and emerging themes were listed based on similar ideas and patterns running throughout the interviews. Finally, these themes were integrated into overall themes and, where appropriate, each of these themes was further categorised into subthemes. Three researchers collaborated to refine, label and finalise the themes. Quotations representing and supporting the themes were collated and reviewed; quotes that best represented the themes were selected.

3. Results

3.1. Content Analysis Results

3.1.1. Fitbit Functions Used

Participants were asked if they used each of the eleven Fitbit functions. **Table 1**

lists each Fitbit function, the number and percentage of the thirteen participants who used the functions, and illustrative quotes.

3.1.2. Three Main Benefits of the Fitbit

Participants were asked: “What are the three main benefits of the Fitbit in your life?”. The top six most frequently mentioned benefits are listed in **Table 1**. And illustrative quotes are provided (**Table 2**).

3.1.3. Social Support and Competitive Use of the Fitbit

Participants were asked three questions: “Do your friends or family support your physical activity and exercise?”; “Do you use the Fitbit for friendly competition with others?” “Do you compete with yourself using the Fitbit to do more physical activity and exercise?”. With the follow-up question: “If so, how?”

Percentages who answered yes are listed in **Table 3**. And illustrative quotes are provided.

3.1.4. Changed View of Self/Identity

Participants were asked: “Has your view of who you are changed, *i.e.*, do you now view yourself as someone who actively does physical activity and exercise or a particular sport or activity?” **Table 4** lists percentage who answered yes and illustrative quotes are provided.

3.2. Results of Thematic Analysis

Five main themes and attached subthemes emerged out of the analysis.

3.2.1. Theme 1: Raised Awareness

Being part of the intervention gave participants factual information about the benefits of, and advice on how to improve sleep and physical activity. It enabled discussions with EIP staff about these topics, allowed consideration and the setting of goals. The intervention provided opportunities for questions, feedback, and sharing experiences with EIP staff and for staff to link patients to the services’ physical activity and social groups, and to identify and signpost to community-based resources.

This is captured in the following two sub themes:

Sub theme 1: *Raised awareness related to health and wellbeing*

Awareness is important for understanding reasons for healthy lifestyle behaviours meaning that people are more likely to adopt them. Participants gained awareness of the importance of sleep, the amount of sleep needed, how to improve sleep and links between behaviours (e.g. engaging in physical activity and sleep). Participants became aware of the benefits of physical activity and other healthy lifestyle behaviours. Illustrative extracts:

P2: [EIP worker] has helped me look into my sleeping because if sleeping is not good, like work on sleeping.

P3: Wearing the Fitbit itself made me more aware that I don’t do enough exercise, maybe I should start doing something about it.

Table 1. Fitbit functions used.

Fitbit function	Number and % used	Illustrative quotes
Steps function	$n = 12$ 92.3%	P2: I used it for fitness, support. P3: I just check it every day. And if I can improve on that. P9: If I haven't done much, then I'll go for a walk. I always get excited when I hit the 10,000, and it does a little display of fireworks. P11: I'm making sure that I'm hitting at least 10,000 steps a day. P14: It's very nice positive reinforcement for being active.
Sleep tracking	$n = 11$ 84.6%	P3: ...proven to me that [my sleep] is not that much different from what other people experience in sleep every day. P8: I monitor my sleep. Just to make sure I'm having the eight hours a night. P9: ...this is a good app to check and make sure that I'm sleeping well.
Sleep score	$n = 8$ 61.5%	P8: So if you know you've got about 90%... you've got good sleep. It was below 90% then you need to work on it. P14: It's just kind of keeping an eye on the good sleep, because maintaining a good sleep schedule is instrumental in maintaining good mental health for me.
Calorie burn feature	$n = 5$ 38.5%	P2: I found out that I burned around 1500 calories based on my steps. When I go out on jogs, for example, I burn about 2000 calories per day. P6: I'm trying to diet, so it gives me a rough idea of how many calories I've burned throughout the day, so I have a rough idea of what I can eat. P11: I'm using it to track my calories intake to make sure that I'm maintaining my weight.
Guided breathing relaxation	$n = 2$ 15.4%	P2: Made me lay back and basically just breathe. That really helped with my anxiety because I've got anxiety. P14: If I was feeling a little bit anxious in the moment... Then it was a good grounding tool.
Heart rate tracking	$n = 12$ 92.3%	P2: I've noticed my heart rate is a bit high most of the time, that's why I'm trying to go on jogs, to minimise that. P8: Especially when I'm going out for walks or runs or cycling. It really gives me indicator on how well I'm doing. To make sure my heart rate increases. P14: If I'm feeling a bit stressed, I can notice my heartrate's a bit higher, and then I can try and bring that down.
Cardio fitness score	$n = 1$ 7.7%	P30: I used that when it shows you the number of stairs you have travelled up.
Reminders to move	$N = 6$ 46.2%	P3: Oh, I did [use reminders to move], like... "I've got to get up now". P8: It helps me indicate when I can start moving again or have a break. P11: Just to make sure that I'm not lying in bed for too much time, just sitting around. P30: Just to remind me to move each hour.
Goal-based exercise mode	$n = 0$ 0%	
Personalised reminders	$n = 3$ 23.1%	P2: For example, go to sleep, to remind me to my do [work on] my website. P11: I actually use those just to make sure when I have an appointment. P30: Just everyday reminders, things that I need to get done. P3: Yes, on the way back from school from my son, I try and pick up the pace, to basically feel I'm doing a bit of exercise.
Heart rate zones	$n = 7$ 53.8%	P9: Yes, in the gym. Or if I'm going for a walk, I like to see my heart rate go up and make sure that I'm actually burning calories. P14: I find that especially good when I'm on a walk and it's saying: you're in zone minutes, you're in fat burn, you're in cardio. I find that's quite motivational, so push a bit harder.

Table 2. Top six benefits of the Fitbit.

Benefit	Illustrative quotes
Improved sleep quality	P2: Has helped me sleep better. P6: Encourages me to go to bed on time.
Increased physical activity	P3: Encouraging me to become more active. P18: It's got me to be more active.
Improved physical health	P8: ...health, so, I walk and exercise. P9: I think it keeps you on track for getting healthier. P15: Well, it helps you keep you healthy.
Monitoring calorie intake	P6: I like the calorie counting one because it helps me think about what I'm taking in. P9: I think it keeps you on track for losing weight.
Provides motivation to be physically active	P14: ...makes you want to do more...it's little bits of positive reinforcement. It is a bit of a pat on the back. P15: It helps you and motivates you when you see how many steps you've done, and it motivate you to do more steps. P16: It keeps me on track, it keeps me motivated.
Provides more structured day	P30: It gives you some order, a routine.

Table 3. Social support and competitive use of the Fitbit.

Question	% Yes	Illustrative quotes
Do your friends or family support your physical activity and exercise?	76.9%	P8: They [friends or family] motivate me, they come out with me, pick me up on a bad day, or they'll start to plan things: go on events. P17: Yeah, sometimes my friends help me go to the gym. P18: Sometimes they come with me. They encouraged me to go outside and take me to places to go outside.
Do you use the Fitbit for friendly competition with others?	46.2%	P16: Sometimes it is quite friendly. So, if someone's like cycling, if someone's quicker than me, it just means I got to work harder.
Do you compete with yourself using the Fitbit to do more physical activity and exercise?	84.6%	P8: Whereas now, with the Fitbit, I can challenge myself. P16: I have a score which I could try to beat. I set time and then after one hour, I would quickly check – was I faster than last time? P30: I try to do more than I did, say yesterday. So, I'll try and be better.

Table 4. Changed view of self/identity.

Answer	Illustrative quotes
Yes 76.9%	P2: [My] view of the benefits of being physically active have changed dramatically...like jogging, and being an active, I see myself in another spectrum of people. I see a more positive person, more cheerful person, I see myself as being more motivated. P3: They have changed...recognising that physical exercise and lifestyle changes can help, feel better, lose weight and to feel more upbeat about things. P11: I'm viewing myself as someone who started again from zero and slowly making his way up to where he was. P16: Before I would be very negative on myself. Now a bit more positives, my attitude is better. Yes. [I see myself as] someone who exercises. P30: I see myself as slightly different...as someone healthier.
No 23.1%	P8: I've always been active. So that hasn't changed. It's just making me better. P9: ...always been the case [that I view myself as someone who actively does physical activity and exercise].

P3: I can see now sleep is important to the overall health. It is now very important in my life, and I make sure that I get plenty of sleep now.

P6: I think it's made me realise that I do need to do more exercise...also that I need to take less sleep as well. I do sleep quite a lot.

P8: They've [EIP] been helpful, so I can indicate where I am where I am...my physical activity, my mental health, my nutrition.

P11: Before, I was working out just for superficial reasons, like how I look, and I wasn't thinking about health, but now I realise that health is the most important thing, and I'm really being more conscious of my diet

Sub theme 2: Raising awareness of need to improve their health and wellbeing and how to do this

People also need to understand how benefits are derived to support motivation for and engagement in regular or daily routine healthy lifestyle behaviours. Participants gained realisation that they need to take responsibility for their health and wellbeing, that looking after their mental health is linked to sleep and physical activity and exercise improves mental health; this was facilitated through their increased awareness. Examples are illustrated by participants' extracts below:

P2: They've [EIP] made me realise that it's really important in order to have a healthy mind, I need to take care of myself, not only mentally, but also physically. I've managed to then implement better sleep, I feel different, and see positive differences, everything, all my aspect of life.

P3: We like talking about exercise...can help and improve mental health, mood, it just makes you more upbeat...lifestyle changes can help [me] feel better, lose weight.

P9: I spoke to [name], said about steps and hitting 10,000 a day. I try and do 10,000 steps a day.

P11: It's also improved my capability because I understand that I can do other things.

3.2.2. Theme 2: Impact of the Intervention

Sub theme 1: Enhanced motivation

Taking part in the intervention provided participants with increased motivation to set goals, be physically active, exercise more, go outside, get out of bed, do activities, adopt healthy lifestyle behaviours, and make self-defined progress in their lives. Participants reported that this improved physical and mental health. Illustrative quotes:

P2: It [goals set] motivated me. It kept me on track. But the main motivation I get is from [named EIP workers].

P6: I'm more motivated. I want to get on and do stuff.... Setting goals helpful, it keeps you motivated, wanting to aim towards something... I do more work than I used to, on my laptop. I don't feel a sluggish all the time.

P8: My motivation has increased just to be a better person...and become more sporty as well.

P9: I think just knowing overall that it's good for you [is motivating]... wanting to see friends...I've joined a gym.

P11: Just gave me an extra bit of motivation to be more active, to not sleep in bed all the time. I'm kind of pushing myself harder every day.

P14: I've definitely been more motivated to be my best self and be as well and healthy as I can, because I've got people backing me.

P14: I think it's very motivating to have someone like a [EIP worker] that you see regularly to check in with and feedback and have them say: that's great that you're doing that.

P18: It [Workbook] helped me put my, what I wanted on paper...so I could really see what it was that I wanted to do. It motivated me.

Sub theme 2: *Feeling/thinking more positively*

Engaging in the intervention (and the resulting better sleep and more physical activity) provided many participants with positive feelings, attitudes and thoughts, and improved energy levels, cognition, and mood.

Illustrative quotes:

P8: Made me feel more comfortable, less anxious. It's really benefited my life, my mood and my health, and my mental health really... It's improved the way of thinking, thinking more positively.

P9: Yeah, just having more energy and just feeling more positive about life.

P11: And now my sleep is perfect, and I'm feeling good all the time. I feel like I'm able to concentrate and do a lot more of important things. My memory has improved. I'm in a better mood all the time. I'm not irritated by things like I was before.

P11: Before...I wasn't getting enough sleep. I was feeling dizzy all the time. I didn't have as much energy as I have now. And improving my sleep just put me in a better physical and mentally wellbeing.

P11: It just gave me hope and made me realise that it's nothing major and I can bounce back from it.

P14: I think it [exercise] does really help, it helps to clear my head. I feel like moving my body, all this anxious energy in your body, and moving about feels like it helps to shift it.

P15: I had the mental breakdown and since then I have been on these things with the Fitbit it has eased it off a hell of a lot, it has made a lot of difference.

P17: [Improved sleep has] improved concentration, less irritability, and improved confidence to try and work.

P30: I would say my mental health has improved a lot. I found it hard to find a point in to doing anything. But now I find it much easier.

Sub theme 3: *Provided a healthier and structured routine*

Participants put in place effective sleep schedules, wake-up routines that included self-care and breakfast, regular times and days for physical activity, and routine exercise activities. This provided a "sense of order", made them more independent with better self-management, benefiting their wellbeing and mental and physical health. Illustrative quotes:

P2: I set a reminder to go to sleep at this specific time because I've got work. So, trying to stick to the programme I've set myself through the Fitbit App. I think it has given me a bit more structure, helpful towards my wellbeing.

P2: Biggest difference is being able to wake up earlier, brushing my teeth having breakfast because I usually don't have breakfast. I've got myself into a much better routine.

P11: I'm going more often for a walk; I'm going swimming and I'm doing other activities

P14: I've definitely got back into my yoga...very beneficial for my mental health as a mindful practice.

P16: It's [Fitbit] made me more organised.

P30: ...it gives you a sense of order and, it will remind you, of how many steps to do and that kind of motivates you and you have some routine.

Sub theme 4: *Improved sleep hygiene*

Participants applied advice gained in the intervention and used their Fitbit data, feedback and software applications to be more physically active to induce tiredness, stop behaviours that prevented effective sleep, develop a better bed-time routine, and make practical changes to their sleeping environment that resulted in improved sleep.

Illustrative quotes:

P2: Basically, not using my phone all night. Having set reminders and... sticking with them to sleep.

P8: Before my sleep was horrendous, I was always overthinking, having suicidal thoughts. And then now after advice, I've switched off the phone, try and cool myself down. Listen to the mindfulness on the App to make me sleep. I have developed a good routine to get to sleep.

P11: Now I'm just drinking coffee in the morning. And that had a huge impact on my sleep. I can fall asleep easier, and I can wake up easier.

P12: It helped me identify how my sleep was affecting me. I am going to bed earlier. Before I only got about four hours sleep, but now I, I get eight hours sleep. In the day I have more energy too...It helps me to get my mind on, to be able to study.

P30: The social aspects..., I would sleep in the day. So, I wouldn't really talk to many people in person. Then I would be awake all night and then I'd feel very lonely. It was exercise that helped to tire you out, and then I would stay awake all day, and then in turn I could sleep at night... that then helped with my mental health.

Sub theme 5: *Increased physical activity*

Participants built more physical activity into their lives, with some attending a gym or engaging in sports—which many found enjoyable. Some also welcomed more “fresh air” and outside opportunities.

Illustrative quotes:

P1: Before that I wasn't moving very much. Because I didn't have a reason to, but now that I'm counting my steps. I'm making sure that I'm getting around

10,000 steps every day.

P2: I mainly, just stick with push-ups, I've got calisthenics, outside of my house near the park, basically I just go there and do some-pull ups.

P11: [Started] walking more, swimming, I went bowling.

P15: Because before I didn't, I always used to use a car now I'll walk down the shop rather than drive.

P16: So, I am doing cycling, so I do a badminton club. I'll go swimming in the morning, the afternoon I'll go to the gym.

P17: I'd say probably going on long walks...it just helps me get more fresh air.

P30: I exercise regularly, but it has got better. I am doing it more routinely each day.

Sub theme 6: *The intervention enabled goals to be achieved*

The intervention facilitated the setting and achievement of goals in relation to sleep, physical activity and exercise/sports. For some, this enabled them to make progress on achieving other goals such as for employment and social engagement/activities.

Illustrative quotes:

P2: I have achieved being able to go to sleep earlier...because I was trying to get back to work. I weren't doing the push-ups; I don't think I would be mentally ready to go to work. I feel more ready to go to work because it involves more physical work.

P3: Well, I'm doing this Jo Wicks videos, now about four times a week, so that's a good start and I'm hoping to improve on that as well...and be more active with my son.

P8: Yeah, so one is going more than 40,000 steps a month. One is to sleep eight to nine hours, and the third one is make sure you get a balanced diet. I think I've achieved all my goals so far. Especially going swimming as well, I'm starting to go to the gym with my referral form.

P11: I've been maintaining my weight...now that I'm tracking my calories. I'm slowly getting back in the mindset of working out properly and being active and healthy, and looking after my diet.

P11: I'm working out, I'm feeling I'm working towards something, I'm making a progress in my life, I'm improving myself on a daily basis.

P14: I think I've definitely got back into my yoga...and that is very beneficial for my mental health.

P16: So, at first, I was cycling for two hours. Now I do it [the same distance] in one hour.

Sub theme 7: *Impact of intervention on confidence*

Many saw improvements in their confidence, which made some participants less anxious, encouraged them to get out of their home more, engage more socially and to do more physical activity; helping to improve mental health and wellbeing.

Illustrative quotes:

P8: Yes, [confidence gained] has made me go back into the outside world

again.

P12: It's helped improved confidence a little bit... Probably because, I get to get out and go for walks. Because I'm doing it with other people, that helps.

P18: I definitely became more confident to do physical activity with having the aim of helping my mental health.

P18: [Goal setting] helped me be more confident outside...I think...it...it encouraged me to not stay inside all the time.

P30: Having the Fitbit and improving has really made me more confident over time to do exercise and keep doing it.

3.2.3. Theme 3: Acquisition and Application of Knowledge

Knowledge and feedback gained through the intervention gave participants greater understanding of the benefits of and how to engage in effective sleep and physical activity. Knowledge around calorie intake was found to benefit weight management. Participants applied knowledge and feedback gained through the intervention. This knowledge resulted in improved sleep and levels of physical activity which enhanced mental and physical health.

Illustrative quotes:

P1: The EIP team have taught me that you need at least 7 hours of sleep to have a healthy sleep schedule. And that 9 hours of sleep it's a bit too much, and it's going to have the same effect as if you didn't sleep [enough].

P6: [EIP worker] talks through the health benefits and...about how the exercise is linked with good sleep.

P8: 10,000 steps...because I didn't know you're supposed to do that many steps a day. And I try and achieve that every day.

P11: They [EIP] told me that maintaining a good physical health and being active it's helping you a lot with your with physical, your mental health...Just gave me an extra bit of motivation to be more active, to not sleep in bed all the time.

P14: A strategy of looking at it from a mental health view opposed to a weight view. What does an anxious day feel like and what can I do about it.

P17: Make sure I stick to a schedule for walks and occasional gym visits. I'd say mental health will improve generally, just less likely to be less depressed.

3.2.4. Theme 4: Impact of the Fitbit

Sub theme 1: *Tracking sleep*

Using the Fitbit and its software applications provided information on time of going to sleep, duration of sleep and quality of sleep. This information led people to understand the impact and importance of sleep and encouraged them to make changes to improve their sleep.

Illustrative quotes:

P9: Looking at their sleep app, and seeing how many hours I have been sleeping, and deep sleep. It makes sure you get into a good routine.

P12: It, gave me how many hours I should be sleeping. It helped me identify

how my sleep was affecting me.

P15: It [Fitbit] lets me know whether I have had enough sleep. It tells you when you go to sleep, what time you go sleep, what time you awake.

P30: For example, the sleep, you can manage how many hours you're getting at night, so you continue to sleep regularly, and it gives you a sense of order.

Sub theme 2: *Tracking activity*

Using the Fitbit activity-related tracking and associated software applications, and having the ability to visually see and monitor their activities, provided goal setting/achievement, motivation, maintenance of targets, incentives to go outside, opportunities to burn more calories, and enabled participants to be more organised. These factors were reported as beneficial to mental and physical health.

Illustrative quotes:

P2: I wake up in the morning. Sometimes I feel like not doing anything, but just seeing the option on the watch about steps and heart rate and everything... something flicks in my mind saying I need to do I need to do something about my life.

P8: The Fitbit is...really helpful, with swimming it gives you how many laps you've done. With the bike as well, how many times and laps you have done. How many floors you've covered in steps. The calories have helped me with my diet as well.

P9: Seeing that there's low steps, you think you've had a bit of a lazy day and so it encourages you to go out for a walk.

P9: Yeah, the heartbeats helpful, because it, you can see if you're sat doing nothing, and it's around 60. And then you're up going for a walk, and then it goes to 100. And then you walk a bit faster, and then it gets to 130. And then, that's when I feel good, because I'm burning calories, now. I'm in my fat burning zone.

P11: I've been eating more because I noticed that I lost my appetite because of the medication I was taking...now that I have the Fitbit that I can see my calorie intake. I am making sure that I'm eating right and I'm eating enough and I'm not losing weight anymore.

P14: I think it's definitely motivated me to do more physical activity and exercise, because of that record, the little pats on the back they give to you as well.

P30: It recommends workout plans...and that was something that I really wanted to make a target.

3.2.5. Theme 5: Other Changes the Intervention Has Facilitated

Participants reported other changes in their lives related to, for example, less smoking, using their inhaler less, increasing socialising, improving stamina, improved hopefulness, improved physique, and improved concentration.

Illustrative quotes:

P3: The moment just basically going out and meeting other people who want to improve on their lifestyle.

P8: I would say the diet, I have reduced smoking as well.

P9: I think not using my inhaler as much, that's good, since walking and just feeling better in myself overall, and having more energy.

P15: It has made me more active... my legs tighter, not as flabby. It has tightened my leg muscles...I feel a lot happier

P17: Better concentration for work. Being more, just outdoorsy.

P18: I have more stamina.

4. Discussion

In-depth interviews were conducted to investigate how the Well-Track intervention interlinked with the real-world experiences of people with psychosis to enhance physical activity, effective sleep, health, and wellbeing. Benefits of physical activity reported by participants (mental and physical health, wellbeing, confidence, sense of achievement, physical tiredness to support effective night-time sleep) align with previous research [29] [30] [39]. Well-Track helped people with psychosis to overcome identified barriers to physical activity, such as a lack of self-esteem, confidence, motivation and support [14] [30]. Adding to existing evidence of individualised interventions in psychosis, most Well-Track participants had improved motivation; positive feelings and thoughts; a healthier and structured routine; better sleep hygiene; and healthier lifestyles [30] [31] [40]. Enabling people to move away from a negative cycle of behaviours and experiences [15] [19], a virtuous cycle was reported whereby benefits of a healthy lifestyle (which includes effective sleep, physical activity, social activities, healthy eating, a structured routine) resulted in improved positive feelings and mood, self-esteem, and confidence, which further enhanced motivation and capability to engage socially and in a healthy lifestyle and meaningful activities. This virtuous cycle can contribute to mental health recovery and progress towards setting and achieving life goals.

The analysis of the interviews highlight the importance and value of an intervention which incorporates a motivational interview; goal setting; information on reasons for, benefits of and how to have effective sleep and a physically active life; and one to one engagement, feedback, and discussions session within EIP staff. This links to existing research on sleep and exercise interventions [27] [29]. This study's results confirm previous research where participants (who took part in a similar intervention but without a defined motivational interview and goal-setting workbook) gained greater motivation to improve quality of sleep, levels of physical activity, and exercise which contributed to their wellbeing, physical and mental health [34] [35] [36].

Supporting previous qualitative research into the experiences of healthy lifestyle interventions for people with psychosis, in this study the role of staff was important, with the participants highlighting that the staff's guiding and informing but not "telling" stance was effective. This stance, along with the addition of motivational interviewing, enabled the participants to be empowered and

in control, which could increase the possibility of the intervention being effective in the long-term [41]. It also helped to foster a meaningful and effective working relationship between the staff and patient, which is important for healthy lifestyle interventions to be successful in people with psychosis [10] [40].

As well as the addition of a brief motivational interview, for this project, the Well-Track intervention was enhanced by the addition of a goal setting workbook, and the results support the additional value of doing this. This study provided details about which Fitbit functions participants used and how they used them to get effective and high quality night-time sleep and have a physically active lifestyle, and the benefits that this provided. This is valuable in understanding the adoption and integration of technology for healthy lifestyles in this population. It is important that participants are informed about Fitbit functions and how to use them, to facilitate uptake. These results support previous research showing the value of actively using a Fitbit and its functions [32] [33]. Answers gained to the free response question “what are the three main benefits of the Fitbit in your life?” are useful to understand what people with experience of psychosis value most about using Fitbits.

As in the general population use of wearable trackers, most participants used the Fitbit-provided data and feedback to compete with themselves. They also used the Fitbit together with others, especially important due to the value of social support and building social connections in people with psychosis—who are likely to be more socially isolated, which can heighten other psychosis symptoms such as paranoia [42]. Positive and supportive social relationships are associated with wellbeing, resilience, coping, realisation of goals, positive affect, development of positive identities, and motivation [43] [44] [45] [46]. For people with psychosis, social support is a key facilitator for maintaining health [47].

It is very encouraging to see that most participants changed their view of who they are, to view themselves as a person who is physically active, does exercise, has a more positive attitude, and has a healthy lifestyle. Identity, beliefs and values are important in sustaining healthy lifestyle behaviour change [48]. This study provided information about how Well-Track enhanced awareness about the need and how to improve health and wellbeing. People need to understand the “why and how” of healthy lifestyles, so they can embrace, adopt, and apply healthy lifestyle behaviour change [49]. These processes underlying the intervention enable links to behaviour change theory, allowing a theoretical basis for Well-Track.

The impact of Well-Track links to the process and concept of mental health recovery: “...a deeply personal, unique process of changing one’s attitudes, values, feelings, goals, skills, and/or roles. It is a way of living a satisfying, hopeful, and contributing life even within the limitations caused by illness. Recovery involves the development of new meaning and purpose in one’s life...” ([50] p. 11]. A systematic review of recovery in mental illness concluded that the recovery framework includes: connectedness, hope, identity, meaning in life, and empowerment (CHIME) [51]. Through the enabling of these factors, Well-Track

has the potential to contribute towards a person's mental health recovery. Facilitating recovery involves assisting people to live the lives that they wish to lead, to do the things that they wish to do [52]; this facilitation was seen in the Well-Track interviews. Participant reports of their experience of Well-Track indicate recovery-related benefits: building friendships and meaningful activities, and positive psychological factors such as self-efficacy, self-confidence, self-respect, sense of self, hope, and motivation [15]. Several participants mentioned achieving recovery-related goals, such as being more organised, engaging in meaningful activity, contributing to the lives of others, further study/education, and work. The identified improvements in energy levels, cognition, and mood seen through the intervention contributed to this goal achievement.

Of particular note is that people adopted healthier and more structured routines (e.g., with their physical activity and sleep), as many people who experience psychosis can have chaotic and poorly structured daily routines and lifestyles due to their mental health problems and related issues (for example, they are less likely to be in formal education and work). Adoption of healthy lifestyle behaviours and improved self-management due to the intervention may be sustained in the longer term and continue to benefit wellbeing, mental and physical health; this could contribute to reduced disease disability-adjusted life years (DALY) and increased life expectancy [1] [5] [6] [8]. A study with a longer follow-up would enable the understanding of whether people continue to use a Fitbit and if healthy lifestyle changes adopted can be sustained, and how this impacts on people's lives.

5. Limitations

Study limitations include the relatively small sample size and the potential lack of generalisability. People who agreed to participate were self-selected. A level of bias may exist in terms of those agreeing to participate having a more positive experience of the intervention and who are currently experiencing fewer psychotic symptoms than the average EIP patient population. Thirteen is an appropriate number for a qualitative in-depth interview study as saturation often occurs at around twelve participants in relatively homogeneous groups [53]. The sample herein was a fairly homogeneous group in terms of diagnosis. The ethnic diversity broadly reflects the area from which the population was drawn, but is less diverse than in other areas of the UK and so reduces generalisability to other populations. The participants all attended a single EIP service reducing generalisability.

6. Conclusion

There is a lack of effective physical activity/exercise interventions in EIP services [29] and Well-Track is a relatively straightforward intervention which can help services meet their requirement to provide healthy lifestyle interventions and to meet their KPIs [28]. This project's intervention offers a way of improving phys-

ical activity which can link to and enable participation in any other physical activity/exercise groups and interventions provided by EIP services. The UK government stated in its mental health strategy guidance a commitment to “changing how we track success in mental health services, so we measure the things that matter most to the people using them” ([54], p. 1). Well-Track has demonstrated that a mental health service can successfully address things that matter to their patients. This project has shown that Well-Track can be fully integrated into EIP services. Well-Track has the potential to be introduced into other healthcare services who see people who experience a high level of sleep related issues and have low physical activity levels, such as at risk of mental state (ARMS) services, cognitive decline/dementia services, community mental health services, depression services, gender identity services, anxiety services, and child and adolescent mental health services (CAMHS).

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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