

Title: ACC.24: Gamification and Financial Incentives to Increase PA Among Patients at Elevated Cardiovascular Risk

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I'm Alexander Fanaroff, I'm a cardiologist at the University of Pennsylvania in Philadelphia, Pennsylvania.

What is the rationale behind this study?

So, we know that physical activity and exercise is hugely important for improving cardiovascular and sort of general outcomes. It reduces all-cause mortality, reduces cardiovascular mortality, produces myocardial infarction, stroke, diabetes, hypertension, hyperlipidaemia.

We also know that most people around the world, and especially Americans, don't get enough physical activity, and that's especially true for people that are older and at higher risk of cardiovascular events.

So a number of studies have shown that interventions involving gamification of financial incentives can increase physical activity over shorter term follow up. But what we wanted to understand in this study is, does it help over longer term follow up if the interventions are longer?

Twelve months in duration, six months in follow up, can we increase physical activity for that longer duration? That's why we did the study.

Could you tell us a bit more about the gamification and incentives used in the trial?

So the interventions are all based in behavioural economic theory. And behavioural economics is a field of study that uses concepts from economics and psychology to better understand how and why individuals make the decisions that they do, and to design interventions that take advantage of any cognitive bias people have to help them make better decisions.

So, the general idea is that instead of sort of being rational, actors like economic sort of assume people are where they maximise their future benefits. People have bounded rationality, which is the idea that we make too many decisions every day to actually make optimal decisions for every one of them.

And we use what are called heuristics or rules of thumb to make decisions. And some of these are the idea of prospect theory, which is the idea that we value things that we have more than things, that we might seek to gain immediacy, which is the idea that we value things in the near future more than things far out of the future, and goal gradients, which is that we try harder when our goal is within reach. So, these are the concepts that we use to design the interventions in our study.

What is the study design and patient population?

So, this is a randomised controlled trial of gamification versus financial incentives versus the combination of gamification versus financial incentives versus attention control.

So, we identified people that were high risk for major adverse cardiovascular events.

So, either an ASCVD risk of greater than 7.5% by the pooled cohort equation, or existing ASCVD, and we identified them by EHR algorithms, and we sent them emails or text messages inviting them to participate in the study.

They then went on to the study. The email had a link to the study website where they went in to where they could register for the study complete informed consent complete baseline questionnaires. After they did that, we sent everybody a Fitbit device, which they wore for two weeks, to establish baseline measures of physical activity and baseline measures of physical activity at that point. They were then asked to set a goal to increase their steps by 33% to 50% above baseline, and once they did that, they were randomised to one of the forearms.

The interventions went on for twelve months, after which everybody had a six month follow up period, and the primary outcome was the change from baseline and daily steps compared with control.

What are the key findings revealed at ACC 24?

Over the twelve-month intervention period, all of the interventions had an increase in step count. So even in the control arm, we had an increase by about 1400 steps per day from baseline.

And you see a very quick increase right after the goal setting period and then a slow decline.

The intervention arms, gamification and financial incentives both increased and daily step count by about 500 steps per day more than the control arm.

So, people were up to about 1900 steps per day more than they were taking at baseline.

In the gamification and financial incentives arms. In the combination arm, where people got both gamification and financial incentives, they increased step count by about 850 steps per day more than the control conditions.

They were up at about 2300 steps more per day than they were taking at baseline.

So big increases of physical activity, both from baseline as well as beyond sort of the control condition.

How should these findings impact clinical practice?

The take home message for practise is that, in my opinion, and not being an expert in sort of the messaging of physical activity, I've seen it's a little bit muddled and I think that that affects patients. You know, the CDC guidelines are actually pretty clear that people should be walking more and sitting less. But I think that there's a lot in sort of the media about taking 10,000 steps per day. And I think that it's hard for patients to sort of track that. But I think that our control group had an increase in physical activity by a substantial amount, and that's something that physicians can do with their patients.

You know, ask them to track their steps either with a wearable fitness tracker or just on their phone, tell them to set a goal to increase it by a modest amount. 33% to 50% is what we use in our

study, which I think is reasonable, and then tell them that you're going to check up on them, because I think that's sort of the big intervention. The biggest part of the intervention is that they knew that somebody was watching and cared. So, I think that that's the intervention that you can take home tomorrow and start doing with your patients.

I think on a broader level, on a health system level, the gamification and financial incentives interventions worked even above and beyond that.

And as we move into capitated models and paper performance and the idea of covered lives, I think that health systems and insurers should think about implementing some of these interventions which are automated and simple to deliver and can really help people increase physical activity by a large amount.

What are the next steps?

We know that physical activity improves outcomes. We know that these interventions increase physical activity. What we don't know, because the data on physical activity outcomes is observational, we don't know. If you enrol people in a programme like this and you increase their physical activity by a substantial amount, will you reduce of their cardiovascular events?

And I think that's the next question. Can we do even longer-term studies? Can we enrol even more patients in these studies to really understand?

If I give you an intervention that will increase your physical activity, will I reduce your risk of cardiovascular events? I think that's the next question and that's probably the big question that I'd like to answer next.