

Preventing cardiovascular disease through smart technologies with Dr Gindo Tampubolon

This is a written transcription of Dr. Gindo Tampubolon's Podcast interview with Dr. Nic Gowland, covering Dr. Tampubolon's research on cardiovascular disease and how it contributes to the UN's Sustainable Development Goals (SDGs).

You can find the audio of the interview here: <https://soundcloud.com/globaldevinst/gdi-the-sdgs-preventing-cardiovascular-disease-through-smart-technologies-with-gindo-tampubolon>

Introduction: You are listening to a podcast from The University of Manchester. In this podcast series, hear The University of Manchester's Dr Nic Gowland, interview some of our leading experts about how their research is helping to deliver the UN Sustainable Development Goals for global health, equality and sustainability.

Dr Gowland: Today, I have the pleasure of speaking to Dr. Gindo Tampubolon, a lecturer in poverty within our Faculty of Humanities and a key academic within our global inequalities beacon. Thanks, Gindo. Welcome.

Dr Tampubolon: Thank you very much, Nic. Thanks for having me.

Dr Gowland: Good. It's good to have you here. I'm looking forward to this discussion. So we're going to get into the detail of this particular case study in a minute, which is titled Preventing Cardiovascular Disease in Rural Indonesia Through Smart Technologies. Before we do that, I'm keen to understand how you came to become a social scientist working in Manchester. Where, where did this passion for social sciences and reducing inequalities begin?

Dr Tampubolon: Well um, I grew up in Indonesia. I hailed from a small town actually, Siantar, and perhaps that's where it all started. Uh, I look at the difference between rural and urban places and particularly the disparity in opportunities available in those places. Um, and what does it do to people's lives? So that's probably why I'm interested in inequality, why I'm interested in making things better for people, uh, and the disparities that, uh, hinders that.

Dr Gowland: Were you always quite a good student in school?

Dr Tampubolon: no, no, we, we, we were lucky because, uh, one of the things that happened in rural areas is until four years, we, we played, we didn't have any exams. We played in the field, uh, chasing chickens, but anyway, that's the plus side.

Dr Gowland: Yeah. So you probably get that love for life, I guess, from, from <that>...Yeah. Um, and how did you end up in Manchester then?

Dr Tampubolon: Um, by the generosity of the British Government. I was as a travelling

scholar, and then I decided to pursue a PhD here. Uh, when I came, of course, uh, Manchester United was in the ascendancy. So that made my choice easier

Dr Gowland: What year was that roughly?

Dr Tampubolon: Oh, 90..., late nineties. Yeah.

So Alex Ferguson was still there. Uh, but things have changed, but I haven't, I'm still at Manchester.

Dr Gowland: Well, good. We're glad to have you here. We'll jump into the case study now. Um, as I mentioned, that, that the title of it is preventing cardiovascular disease, just so everyone kind of understands what. We hear cardiovascular disease mentioned a lot. Well, what does cardiovascular disease mean for the layman?

Dr Tampubolon: Basically it's the, um, deposit of fatty acids in the arteries. And also blood clots. So those are the basic issues that we're dealing with with cardiovascular disease. And that leads to all sorts of, um, things like heart failure, or the popular one is stroke.

So those are the cardiovascular disease that we are interested in, and that's quite common in..., um, around the world, but increasingly in low- and middle- income countries,

Dr Gowland: How common?

Dr Tampubolon: Ooh. Um, if they were aware of it, it's much more common than they thought of, uh, more than 30%, or more than a third of deaths are actually attributed to cardiovascular disease,

Dr Gowland: Such a common thing! Well, what causes the diseases, and in countries like Indonesia specifically?

Dr Tampubolon: Absolutely. And, um, just to say that, uh, we are at, we're leading our students now on their field work in Uganda and it's it's happening even as we speak. Uh, I had my sources last week, uh, speaking about it as well. So in low-and middle-income countries, uh, especially in Indonesia, this is a big issue and an increasingly a big issue there. And that has to do unfortunately with, um, the good things, perhaps in people's view, the improvement in their life chances that lead them to certain kinds of diets that are not balanced, certain kinds of lifestyle that are far from being physically active.

Uh, and, and smoking. So these three things, uh, unbalanced convenient diet, um, reduced... sedentary <lifestyle>, <reduced> physical activity, and smoking. Those things unfortunately contributed to cardiovascular disease risk, but at the same time, um, they are largely preventable, by states and by persons.

Dr Gowland: Well, those things you mentioned, obviously low- / middle-income countries, but those are those three factors you mentioned seemed quite relevant to, you know, wealthy countries as well and very developed countries. So is this, it really is a global problem.

Dr Tampubolon: Yes, it is. It is a global problem. It is a global problem, but at least here in, um, high-income countries, there is increased awareness, there are facilities to deal with it, uh, whereas in low- and middle- income countries, they have just come slowly to terms with it. And, uh, the facilities are still limited.

Dr Gowland: That was an interesting point. That kind of explains the divide that. So it affects everyone, but there's a divide in terms of access to health care, things like that...

Dr Tampubolon: Exactly.

Dr Gowland: We'll get more to Indonesia now, then. And when I was doing a bit of research, I'm a bit embarrassed to admit that I didn't know that Indonesia was the fourth most populated country in the world, which, which is incredible.

Dr Tampubolon: You're not alone. That is partly our fault for not telling the world about it. Yes, but you're right. Um, the fourth, most populous country in the world and also the largest Muslim country, um, contributed a lot to, uh, international relations. So we are part of the Southeast Asian Nations which have been active in keeping peace in the region and so on. But, uh, yes, we have our fair share of, uh, problems too.

Dr Gowland: So it's a country of 267 million. I assume that's quite a good country for things like health studies and things like that, there's a lot to kind of get out of there in terms of data, right?

Dr Tampubolon: Absolutely. Absolutely. And it's right bang there in the equator. And therefore it, uh, is a source of fascination for researchers, uh, especially like me doing noncommunicable disease research.

Dr Gowland: And what was the kind of health status of Indonesia? I read that there's, they're trying to implement a kind of universal health care system. Is that the case?

Dr Tampubolon: Absolutely. It launched in 2014, a bit late compared to some of the countries in the region. But, uh, it is coming up to speed even as we speak, because as I've mentioned, rural, urban divide, um, we are an archipelago that stretches from..., if you put it on European maps - from London to Tehran. Uh, and so we have our own challenges in dealing with spatial disparity. And so even though it was launched in 2014, uh, quite a while ago now, um, it isn't yet fully covered..., but, uh, it's getting there.

Dr Gowland: So we'll get more into the case study now, then.

So cardiovascular disease and in Indonesia, you've mentioned, you know, a cause of around a third of deaths worldwide. Tell us what you found when you looked at cardiovascular disease and Indonesia. Specifically, about those with moderate to high risk who are not receiving care, because this is quite an incredible statistic you've found.

Dr Tampubolon: Yes, it is incredible. The first time we looked at it, I must say one of my PhD students and I, together, we looked at it. I used to work with one, uh, blood biomarkers, um, a protein that circulates in our blood. Um, that I use to study older Americans and older Britons. And when it was collected for the first time in Indonesia. Uh, my student and I jumped at the opportunity and we analysed the blood biomarkers to find what's the level of risk in the population.

And then we ask, as it were, the person, "are you uh, being seen by a cardiovascular specialist or by a doctor or by a health professional?" And when they say "no", then we say, "well, actually you are at risk, but you're not aware of it". So that's the idea between, uh, behind unmet need for cardiovascular care.

Obviously they need care, but it's not met. They are not seen by any health professional.

Dr Gowland: But you found that around 70% ...

Dr Tampubolon: Absolutely. So when they are 40 years old, upwards of 70% of them who were at risk, um, are not seen by any health professional.

The thing about the risk of cardiovascular disease in low- and middle-income countries compared to in high income countries is that it happens also earlier over there. So not only the rate is higher, we talk about more than a third, compared to 30%, for instance, but behind that is it happens earlier. So the lifestyle damage happens much earlier there for the same level of risk. You see people aged 60 years old suffering that <cardiovascular disease> here in developed countries, but you see people in their forties in low- and middle-income countries who are at the same level of risk.

So that's the reason why we began to look at it at the age of 40 typically. Uh, people look at it at age 60 or 50, but we went, uh, younger because we suspect this happens earlier. And indeed it does.

Dr Gowland: 40 is very young isn't it? When you think about it,

Dr Tampubolon: 40 is very young. I mean, some people say life begins at 40. They're already at risk!

Dr Gowland: That's amazing. So in simple terms, what do you use to kind of identify..., what does moderate and high risk mean?

Dr Tampubolon: Uh, moderate and high-risk means, uh, if they have a one-in-five chance of death within 10 years from cardiovascular disease or, uh, emergency hospitalisation or hospitalisation. One-in-five within the next 10 years. And before you know it, um, this decade will pass. High-risk means one-in-five, either died, or were hospitalised from cardiovascular events - heart failure, stroke..., and that's a huge number and that's at the peak of their working age.

Dr Gowland: And you used a biomarker to identify that, is that right? Yeah. Okay. Tell us about this, this project that we're discussing now, this case study, and you used a different approach to the..., to the biomarker. What was it? Several biomarkers you

used in this one?

Dr Tampubolon: Uh, biomarkers. Uh, so we brought the two strands together. My interest is in disparities, especially, um, for people in rural areas and my interest is in using biomarkers to know the true risks.

So we went to people in rural Indonesia. Um, we collected their biomarkers and we use it to establish whether they are indeed at risk. Now, beyond that, I think the most interesting thing, uh, for us, are two things. One is we develop an app, uh, that we can put on Android. So it's an open source.

Dr Gowland: The smart health app?

Dr Tampubolon: The smart health app. But equally important. We rope in, we engage local health volunteers. And I couldn't speak, uh, more highly of them because they are basically high school graduates. Um, and we put it in their hands, the apps, we train them as well to draw blood so that they know what blood biomarkers are in there. Um, and the rest is the algorithm does it. We designed the app, such that it is very simple. It tells us in the typical traffic light system, green, amber, red, whether someone is at high risk, moderate risk or if they're all right.

Dr Gowland: And again, so you carried out this study again with these volunteers. Did you kind of see the 70% figure again in the population?

Dr Tampubolon: Unfortunately it's getting worse.

Dr Gowland: So it's going above 70% from this?! So tell us a little bit more about these volunteers. You mentioned when we chatted before about this kind of milk to blood philosophy of these volunteers?

Dr Tampubolon: Yes, these volunteers, they've been doing some good stuff in the villages. Uh, usually to do with child or infant health. So telling young mothers about the good of breastfeeding and so on. Right. Um, so, so that's where we come in. We thought, well, actually they are aware of the importance of certain things for health, like making sure that young mothers breastfeed their baby.

What about if we trained them as well to work with blood samples? So that instead of advising mothers about the good of milk, um, advising any adults about what's in their blood that can tell them to prevent premature death from cardiovascular disease. So one pitch we used to make, is this is helping you. Hmm, from blood... from milk to blood to help, not only the infants, but the whole villages - their mothers, their fathers, their grandfathers and parents.

Dr Gowland: And those volunteers embraced that, did they, do they seem quite keen?

Dr Tampubolon: Absolutely. Absolutely. The other thing that happened with the volunteers is that because the information that they gathered, uh, is fed into the doctor's system, the primary health care system, they get, the volunteers get some sort

of a recognition that what they gather is actually, um, useful for the doctors to make decisions. And so that encouraged them a little bit more, that increased their status as well.

And they appreciate it very much.

Dr Gowland: You're onto something. It sounds very simple, as you explain it, which I think is key, and what we'll come back to, but...

Dr Tampubolon: It is actually simple, Nic.

Dr Gowland: That's the view, isn't it? The best innovations are the simple ones, I think. But were there any challenges with this, this kind of group of volunteers telling people sometimes bad news or giving, you know, having some kind of, um, you know, almost medical importance?

Were there any issues with them getting respect or appreciation?

Dr Tampubolon: Absolutely. There were issues behind the scenes before it was all set up. We had to talk a lot to persuade and work along with the doctors, the health professionals, because obviously these are the things that they are used to dispense. This is the advice they are used to, uh, giving people, this is the information that they are used to, to deriving and sharing.

But now some of this is actually going to be done by the health volunteers in the villages, not in the office, not in the hospital. And so we worked a lot with doctors, with health professionals, to say, look, let's share this burden together for the benefit of all the villages. And also it will help you to get more timely information, more accurately. Frequently. So, so I think that's the, one of the hardest bits.

Dr Gowland: Absolutely. So, so you, so this study set up this new process. You've got volunteers in place and an app, which they could use to, to very simply, kind of indicate the risk of cardiovascular disease risk. What did the study find? What results did you see?

Dr Tampubolon: We found a huge unmet need for cardiovascular care. And then we have an intervention, of course, the apps and the whole system around it. Uh, we compared it to the villages that run as usual, so business as usual case, versus this intervention. And after a year we checked the villagers themselves, we checked their risk, whether it's actually managed, controlled, not increasing...Um, and we did find that... So that is pretty encouraging because that intervention, however complex, actually works in the lives of the villagers themselves in reducing their risk.

Dr Gowland: So some of the figures I've seen, uh..., around 12,000 people receive treatment from the study. Almost 4,000 people had an extended life expectancy as a result of the intervention.

Dr Tampubolon: Yeah. Absolutely. And, um, not only they have an extended life expectancy with the whole package, we just calculated recently, we have a paper just published last week in Health Policy and Planning, that it's actually cost-effective. So the government, um, if they want to pick the low hanging fruit... Um, let's just involve the

health volunteers, high school graduates all over, so that we get all these benefits shared, much more likely.

Dr Gowland: Okay. That's an interesting point you're making - it's something we hear quite a lot about cost-effective intervention. Can you just explain simply how intervening here, you know, saves money for the government and for the kind of healthcare systems later on?

Dr Tampubolon: Well, you just mentioned it. Not only that they increase their life expectancy. But when their life expectancy increases, their chance of working productively for their families, for the societies, paying their taxes, contributing to the life of the communities and so on... Um, we didn't account for that. Yeah. But even if we accounted only for the limited productivity, um, the limited, uh, cost of death prematurely, it's already very cost-effective.

Dr Gowland: And the intervention itself is a, is a low-cost blood pressure lowering medication, yeah?

Dr Tampubolon: exactly. That's part of the essential drugs, off-label, off-patent, so, anywhere in the world, really.

Dr Gowland: It's a very powerful, powerful study that. Obviously the next step, which I think you're doing now, currently, this is scaling, scaling this up now to almost 3 million people in Malang. Is that right?

Dr Tampubolon: Absolutely. But also we are mulling..., we are considering two directions really. One of the fundamental lessons is that involving people who are not medically trained, but are involved in their communities is a viable um, step to deliver good health care. And so irrespective of what kind of disease that we're talking about, even communicable disease, like COVID-19 involving the health volunteers in monitoring... In, uh, upholding guidance for good, um, distancing and so on. It can work involving the health volunteers for the more traditional noncommunicable disease that are increasing in developing countries, like diabetes, managing that. Instead of people having to come to clinics. What about health volunteers actually going to the houses and the communities and sharing good..., managing uh, diabetes?

Dr Gowland: So in terms of rolling this out and then, or scaling it up, who were the kind of key decision makers or stakeholders you need..., do you need government to support this? To roll it out? I mean, have you got the kind of,

I don't know, the government organisation, got the Malang government on board with this? Is that the key?

Dr Tampubolon: That's key from the very beginning. I forgot to mention that even as we work along with the doctors, with the health professionals, of course, they are all under the umbrella of the district health authority.

So, so it's a district health authority, uh, that needs to be involved very early on. And we are fortunate that our local partner, the graduate from Manchester University, I let you know, um, he's actually very, very, um, good in, in maintaining good relations with the district authority and the local communities. So they are key.

Dr Gowland: Another question on this is why has this been successful where others have not been successful? Similar, similar ideas haven't worked. Why has this one worked?

Dr Tampubolon: Well, I must say what you just said there are not my words, it's the word of a commentary to our paper. So there is a commentary to our paper who compared this with interventions in two other countries, uh, almost exactly similar. But it didn't work in two other countries. Why is it, uh, uh, working here? Well, we're still studying that obviously, but my money is on the health volunteers are the key to the success of this. They are committed and they are skilled. Uh, they work with, as I mentioned earlier, milk, we train them to work with blood, but their commitment is something that we didn't train, they have the commitment to look at the health of their communities better. Uh, I think that's the key.

Dr Gowland: The cohort you targeted in this might be the kind of key to this and that they already had that, that nature of, of wanting to do...

Dr Tampubolon: Yeah.

Dr Gowland: Also probably the simplest to, we mentioned this before, but I mean, generally how important is simplicity to these interventions and these...?

Dr Tampubolon: It's, it's, it's critical.

We, we spent a long time discussing within the research team, uh, how far can we simplify this? Um, I'll, I'll let you know the WHO has five levels and it's still the standard used everywhere in the world. Five different shades of colours, and it's just not working. Um, it's it's..., so we, we changed it into..., we simplified it to three..., um, a traffic light system, which is well recognised around the world, uh. It is so easy to, to use, to deploy and for people to adhere to. They adhere to stop when they see red light... Well, they adhere to changing their behaviour when they were told, uh, in a certain colour...

Dr Gowland: Yeah. Absolutely. Very, very understandable around the world, as you said, so, you know, brilliant, a brilliant project, a brilliant implementation and plan and operation around it. How far could this go then?

Do you think, I mean, you mentioned some of the diseases that could be applied to... Are there limitations as to what, what countries this could be applied to? I don't

know..., smartphones are a limitation, but I think not, because you could provide them, where could it go do you think?

Dr Tampubolon: Well, uh, I've mentioned, uh, I think in the second or third minute that just last week I heard about hypertension increasing in Uganda. And I, and I don't see, uh, a huge difference in the situation at least of unmet need for cardiovascular care in Uganda in or in many of the low- and middle- income countries.

And as you rightly said, the app itself, is is an open source..., an Android is available anywhere. I think it's more the culture. Do we have the community infrastructure, something like the local health volunteers that are committed, supported, are willing to be trained... Um, are there enough, uh, local health authority support...

Um, if, if we have that it's worthwhile going and trying it. And it doesn't have to be on cardiovascular... It, it can be on, um, uh, diabetes, as I mentioned earlier, or any other locally known diseases that really need to get attention.

Dr Gowland: And as part of this podcast series, we're also looking at how these, these projects align with the UN Sustainable Development Goals.

This, this project clearly addresses quite a few. Um, good health and wellbeing is one of them and also links, I think, to decent work and economic growth, as you said before, but very much reduced inequality, I think this addresses...

Dr Tampubolon: I'm very proud of the fact that it does reduce the gender digital divide.

Dr Gowland: What do you mean by that?

Dr Tampubolon: Because many of our health volunteers, in fact, 98% of those health volunteers in the villages that advise mothers about the good of breastfeeding, they're women.

And we give them the app. We give them access to the internet. We train them about using the internet, of course, for this app. But also for other things as well as a part of the background infrastructure. And so that does something for reducing the gender digital divide that you see everywhere in low- and middle- income countries. So we are, we're particularly proud of that as a side effect as it were.

Dr Gowland: Yeah. I hadn't thought of that one. I mean, there's obviously that kind of health inequality as well that it addresses, and then between that and other countries...

So smart health, is smart health an app that's just going to be used in Indonesia, or is that going to be..., is it, is it a platform that can be used anywhere?

Dr Tampubolon: Well it's being used, but we are very careful. Like I said, we try to have randomised trials, or close our randomised trials, so that it's actually helping everybody in, in establishing the evidence-base. Uh, so, and it doesn't need to be smart health. There are other interventions that use, um, mobile technologies, um, that, that can help deal with health inequalities.

Dr Gowland: Okay. And finally, while we're on this case study... What, what did you learn from this? You know, you're an academic, you're always thirsty for more knowledge. What, what one or two things did you, did you learn from this yourself?

Dr Tampubolon: I, I learned a lot, but one of the things that I am, am, really uh, impressed by is the work between technology and people. It is essential to actually make things happen, and happen in a good way, um, that it doesn't have to be University-educated... We have our local health volunteers, <who are> just high school graduates. Um, and technology's so easy to work with these days, so that it can work with, uh, people of all different familiarities and access, uh, um, and digital literacy, as long as we, as researchers we think carefully and are willing to listen to our constituents, our partners, um, we can find ways to offer, uh technology-based with, um, people involvement to, uh, improve the healthcare of people in low- and middle-income countries.

Dr Gowland: Yeah. Brilliant. Um, so looking at future work, we're almost at the end of this discussion. What, what are your, kind of, personal drivers moving forward in your career?

Where would you like your research to take you next? If money was no issue, funding and things like that, where would you love to apply yourself?

Dr Tampubolon: Oh, easy. At the moment, I work a lot on cognitive impairment and cognitive ageing in America and in Britain. Believe it or not, as you just mentioned, all three of the top four countries that you mentioned, at the very beginning, China, India, and Indonesia, at the blink of an eye, they will be ageing. So more than one in six of their population will be 60 years old. And by that point, the process of ageing, cognitive impairment, dysfunctions, disabilities, and diseases are going to set in. And when you talk about nearly two and a half billion or 3 billion people, that's quite a lot of people. So, my next one is studying ageing and cognitive impairment in all these three countries. And I'll have plenty of opportunity. I can assure you that.

Dr Gowland: Absolutely. And what, what will your role be then? Would it be a similar sort of role - of how do we find these populations? How do we get treatment to them?

Dr Tampubolon: Absolutely because, um, we are far ahead here in, for instance, no age discrimination. There is huge age discrimination in these countries. By the time you're 60, you're done. No one is expecting anything from you. Society can forget you. That shouldn't be the case. That shouldn't be the case. They contribute still a lot. Um, they contributed inter-generationally. They contributed to the life and diversity of society. So that's where I'm heading next.

Dr Gowland: One last thing I wanted to ask you before we finish, with nothing to do with your study, but I noticed that you and a number of academics co-authored a paper on COVID-19 and the case for global development. One part that stood out to me was the growing protectionism and nationalism of supply chains.

Dr Tampubolon: It's self-defeating, isn't it?

Dr Gowland: Yeah. So we hear a lot about vaccines, but I think there's also PPE devices, even staff... What do you think needs to be, needs to be learned post COVID in that sense?

Dr Tampubolon: Yeah. If we learn, uh, about the fact that it is self-defeating that's one good thing. Another one is, we know now that we are only safe if everybody's safe. So all these restrictions and nationalism is, is not only self-defeating, it's actually dangerous. So in future post COVID, I would like to see a bit more sharing and a bit more global collaboration. A recognition that we're in this together and specifically sharing of technology, spreading knowledge, so that we can respond to global challenges like this a bit better, a bit more um, coordinated, a bit more global rather than national, restricted, self-defeating. More uh, concerted collaboration. Absolutely.

Dr Gowland: I think that's a, that's a very powerful bit to end on. So I think we'll leave it there again though. Uh, I want to thank you very much for your time and for talking us through this case study, which I think is a fascinating piece of research and, you know, congratulations to you and your team on that.

Dr Tampubolon: Thanks. Thanks for having me.

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