

# Family-based interventions can help to prevent cardiovascular disease

Cardiovascular diseases (CVD) are the leading cause of death worldwide, but the number of deaths are disproportionately higher in low- and middle-income countries. Lifestyle factors such as diet, exercise, smoking and alcohol have well-understood links to CVD. Fortunately, risks from these factors can be modified through lifestyle interventions. However, lifestyle interventions at the individual level often fail to produce desirable results. Dr Panniyammakal Jeemon of the Sree Chitra Tirunal Institute for Medical Sciences and Technology, Kerala, India, investigates the impact of family-based interventions in reducing the risk of CVD. His work demonstrates the key importance of the family unit in promoting cardiovascular health to prevent future catastrophic events.

Cardiovascular diseases (CVDs) are the leading cause of death worldwide, resulting in almost 18 million deaths every year. These include disorders of the heart and blood vessels, around 85% of people who die from CVD do so as a result of heart attacks or strokes. Although CVD is prevalent in every part of the world, 75% of deaths occur in low-and middle-income countries. India is no exception. With a population in excess of 1.3 billion, nearly one in three deaths are due to CVD. In addition, when compared to people in high-income countries, Indians are more likely to be diagnosed with CVD at a younger age, i.e. before 65 years old. This means that many people in India experience CVD when they are still of working age, placing a greater burden on families who may suffer from a loss of income.

## FIGHTING HEART DISEASE BEGINS AT HOME

Dr Panniyammakal Jeemon and colleagues at the Sree Chitra Tirunal Institute for Medical Sciences and Technology, Kerala, are pioneering family-based approaches to tackle CVD. In families known to be at high risk of CVD (for example, because at least one member has been diagnosed with heart disease) particular interventions targeting various aspects of family life can effectively promote cardiovascular health and reduce the future risk of CVD.

Dr Jeemon played a key role in a large-scale trial, called the Programme

of Lifestyle Intervention in Families for Cardiovascular Risk Reduction (PROLIFIC), that aimed to deliver targeted preventive care to families at high risk of CVD in Kerala, India. Kerala has the highest rate of ischaemic heart disease (also known as coronary heart disease; caused by narrowed arteries) of any Indian state. Adults living in Kerala have a 10-year risk of experiencing a CVD event of 20%; that is, they have a 1 in 5 chance of suffering CVD within the next ten years. In addition, around 20% of families in Kerala have a family history of premature ischaemic heart disease. Dr Jeemon's research also shows that individuals who have a family history of premature ischaemic heart disease are at 9-times higher risk of developing a future cardiovascular event than individuals without such family history. This means that Kerala is ripe for interventions like PROLIFIC, seeking to drive down the risks of CVD in those families most likely to be affected.

The PROLIFIC trial was based on the fundamental idea of the family as a unit. In terms of making decisions and following through with changes in behaviour, the family can be seen as a system. For example, if one member of a family experiences a life-threatening medical emergency, such as a heart attack, other family members may change their own behaviour as a result. These changes could involve alterations to diet, attempts to cut down on smoking or drinking, or a commitment to exercise, amongst other things. If



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the family, as a whole system, supports these changes, there is a better chance that they will lead to a lifestyle with a reduced risk of CVD.

Whether or not lifestyle interventions are successful depends on a number of factors. For example, research has shown that people's dietary habits can be greatly influenced by family and friends. Active support from family can therefore significantly improve an individual's likelihood of maintaining changes to their lifestyle. However, a lack of understanding of CVD risk factors, along with a failure to adapt lifestyle recommendations to a specific culture, can lead to failure of public health interventions.

## FAMILY SUPPORT OFFERS A ROUTE TO BETTER HEALTH

In recent work, published in *Wellcome Open Research*, Dr Jeemon looked at the reasons why people at risk of CVD might fail to engage with lifestyle interventions. Specifically, Dr Jeemon and his colleagues sought the views of people participating in the PROLIFIC trial, as well as those of their family members and community health workers. The team also investigated why people might be more, or less, likely to participate in and engage with

programmes that aim to improve health through lifestyle modifications.

It quickly became clear that many of those interviewed were aware of the risk of a family history of CVD. This was often the driving force behind enrolment in the PROLIFIC trial. Several of the younger participants explained that they

had witnessed older relatives suffering from CVD and were keen to avoid the same conditions themselves.

As part of the PROLIFIC trial, participants had their blood pressure and blood sugar levels regularly checked by community healthcare workers, a strategy commonly referred to as 'task-

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## Adopting a family centred strategy, lifestyle changes can be more achievable for both individuals and families, meaning they are more likely to be maintained on a long-term basis.

sharing'. Many participants appreciated this frequent, convenient – and, importantly, free – monitoring of their health. Some enjoyed the reassurance of learning their results were normal. These regular visits also allowed healthcare workers to reinforce key lifestyle messages in areas including diet and exercise. In recent work published in *The Lancet Global Health*, Dr Jeemon and his team demonstrated that such 'task-sharing' strategies involving community health workers are effective in achieving population level blood pressure reduction in low and middle-income country settings.

Many of those interviewed talked about the importance of family support. For example, one participant said that his wife's willingness to adopt the

lifestyle changes helped him in his own efforts. Often, the person doing the shopping and cooking (usually the wife/mother) was able to make changes that benefited the whole family. Many of the women interviewed mentioned that they had reduced their use of oil, salt and sugar in cooking.

Dr Jeemon also hoped to uncover the potential barriers to lifestyle improvement. Some people said that they did not have time to exercise, for example, due to the demands of work and family. Some homemakers struggled to balance the goals of a healthier lifestyle with the varied dietary demands of their family. Sometimes, financial difficulties prevented participants from purchasing healthy foods, like fruit. In addition, participants who smoked or

drank alcohol were often not prepared to acknowledge the risks of these habits. The PROLIFIC trial incorporates various strategies to address the potential barriers to lifestyle improvement and health promotion in family settings. The final results of the PROLIFIC trial will provide crucial evidence to advocate for a family based and non-physician health worker delivered structured lifestyle intervention model, to achieve major impact on population level cardiovascular risk reduction.

### THE FAMILY SYSTEM IS THE KEY TO BEHAVIOURAL CHANGE

Dr Jeemon's work highlights the interconnected nature of the individual, the family, and their environment. It is clear that the mutual interdependence of a family can make the adoption of lifestyle changes easier – but sometimes more difficult, too. The person who does the cooking might decide to use healthier ingredients, to the benefit of the whole family, or they might struggle to convince other family members to make changes to their own diets.

A family's environment can also affect the ability, or willingness, to make lifestyle changes. Some people in Dr Jeemon's study reported that they had no time to exercise due to other work, either inside or outside the home – they also felt that their work provided enough physical activity in itself. Lack of space, or safety concerns (such as exercising outdoors after dark), are also environmental factors that can hamper efforts to adopt a healthier lifestyle.

Dr Jeemon concluded that it is vital that programmes like PROLIFIC, seeking to improve health through lifestyle interventions, have the flexibility to be tailored to each family's unique circumstances. This could be done in consultation with participants, who may benefit from the opportunity for a more active role in the process. In adopting a more family centred strategy, lifestyle changes can be made more achievable for both individuals and families, meaning they are more likely to be maintained on a long-term basis. Looking to the future, strategies like this can offer hope to many families with a history of CVD, in India and around the world.



# Behind the Research

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### Research Objectives

Dr Jeemon Panniyammakal's research is focused on chronic disease epidemiology.

### Detail

Jeemon Panniyammakal  
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### Bio

Dr Jeemon obtained his PhD in medical cardiology from the Institute of Cardiovascular and Medical Sciences, University of Glasgow. He is currently a Wellcome Trust-DBT India Alliance fellow, Fellow of the European Society of Cardiology, Senior Research Fellow at University of Birmingham, UK and Affiliate Research Fellow at the University of Glasgow, UK. He is also part of the World Heart Federation's Emerging Leader's Cohort of 2019.

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### Collaborators

Public Health Foundation of India and University of Glasgow



Engaging the whole family in cardiovascular health promotion may break the barriers to active life and facilitates long-term maintenance.

### References

Joseph MJ, et al. 2019. Perceived facilitators and barriers of enrolment, participation and adherence to a family based structured lifestyle modification interventions in Kerala, India: a qualitative study. *Wellcome Open Research* 4:131. <https://doi.org/10.12688/wellcomeopenres.15415.2>

Jeemon P, et al. 2017. A PROgramme of Lifestyle Intervention in Families for Cardiovascular risk reduction (PROLIFIC Study): design and rationale of a family based randomized controlled trial in individuals with family history of premature coronary heart disease. *BMC Public Health* 17(1):10. [doi:10.1186/s12889-016-3928-6](https://doi.org/10.1186/s12889-016-3928-6).

Chacko M, et al. 2020. Family history of cardiovascular disease and risk of premature coronary heart disease: A matched case-control study [version 1]. *Wellcome Open Res* 5:70. <https://doi.org/10.12688/wellcomeopenres.15829.1>

Anand TN, et al. 2019. Task sharing with non-physician health-care workers for management of blood pressure in low-income and middle-income countries: a systematic review and meta-analysis. *The Lancet. Global Health* 7:6 PE761-E771. [https://doi.org/10.1016/S2214-109X\(19\)30077-4](https://doi.org/10.1016/S2214-109X(19)30077-4)

### Personal Response

**How will your research findings help lifestyle intervention programmes like PROLIFIC be adapted for different cultures, or for different parts of society?**

Despite variations in family structure, there are a lot of similarities in the major domains of family functions across different cultures. Unequivocally it is also established that family history of premature ischaemic heart disease is a strong risk factor for future cardiovascular events. The PROLIFIC study exploits the interconnected nature of the individual, the family and their environment, and recommends family based strategies for early adoption of healthy lifestyle and maintenance of optimal cardiovascular health. The PROLIFIC interventions are tailored to the needs of the family members and can be easily adapted across different cultural settings.