Sociodemographic and Psychosocial Determinants of Cardiovascular Health among Women Patients in Thika and Kiambu Level Five Hospitals in Kiambu County, Kenya

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Abstract

Cardiovascular disease (CVD) remains a predominant global health issue, with women experiencing higher mortality rates and poorer outcomes compared to men. This disparity, influenced by sociodemographic, psychosocial, and clinical factors, is underexplored in low- and middle-income countries (LMICs). In Sub-Saharan Africa, the rising prevalence of CVD driven by urbanisation and lifestyle changes underscores the need for targeted research in regions such as Kiambu County, Kenya. This study assessed the sociodemographic, psychosocial, clinical, dietary, and health literacy factors associated with women's cardiovascular health at Thika and Kiambu Level 5 hospitals. The target population consisted of 400 female patients exhibiting CVD symptoms. A sample size of approximately 285 was determined using the Mugenda and Mugenda (2013) formula, based on Kenya's hypertension prevalence of 24.5%. Data was collected through structured questionnaires using simple random sampling. Statistical analysis, including chi-square tests and regression modelling, was conducted to identify key predictors of CVD. Analysis revealed that individuals aged 19-43 years accounted for 19.5% of diagnoses. Among participants, 31.3% had hypertension and 33.5% had diabetes. Psychosocial results showed 13.8% were diagnosed with depression, while 31.5% reported high stress levels. Dietary habits included consumption of refined foods (24%) and fried foods (21%). Furthermore, 27.5% lacked CVD knowledge and 29.8% had not received nutritional education. These findings emphasise the need for targeted health literacy interventions and comprehensive public health strategies by the Kiambu County Department of Health Services to address hypertension, diabetes, and psychosocial stress. Such measures are crucial for mitigating CVD risks among women in Kiambu County and similar LMIC regions.

Keywords: *Cardiovascular disease, Health literacy, Dietary factors, psychosocial stress, Dietary habits.*

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1.0 Introduction

Cardiovascular disease (CVD) is a major global health issue that disproportionately affects women more than men, leading to higher mortality rates and poorer health outcomes (Garcia et al., 2016). This disparity is influenced by a range of risk factors specific to women, such as social, economic, and psychological issues, including domestic violence and depression, which heighten their vulnerability to CVD (Kivimäki & Steptoe, 2018). The growing ageing population, particularly in low and middle-income countries (LMICs) like those in Sub-Saharan Africa, exacerbates this problem. CVDs are expected to account for half of all deaths in the region by 2030 (Global Burden of Disease Collaborative Network, 2020). Although strategies to mitigate modifiable risk factors such as smoking, diabetes, obesity, and hypertension are essential (Mosca et al., 2011), there remains a significant gap in understanding gender-specific CVD differences due to historical biases that have prioritized male subjects in clinical trials (Bruno et al., 2020). This lack of knowledge is critical, especially as women face unique conditions like stress-induced cardiomyopathy and spontaneous coronary artery dissection (Vogel et al., 2021). Recent research has highlighted the need to address the distinct features of CVD in women.

Benjamin et al. (2020) point out that women often present atypical symptoms, which can lead to delayed diagnosis and treatment. Socioeconomic status and healthcare access are crucial factors influencing cardiovascular outcomes in women across Africa, as noted by Murray & Lopez (2013) and Kengne et al. (2013). Virani et al. (2020) emphasise the influence of cultural and social factors on health-seeking behaviour and treatment adherence in the African context. Globally, CVD accounted for approximately 35% of female deaths in 2019 (Mozaffarian et al., 2016), underscoring the urgent need for targeted diagnostic, therapeutic, and preventive interventions. Addressing disparities in healthcare access and awareness of risk factors is crucial in reducing the CVD burden among women, particularly in high-prevalence regions like North and Middle East Africa (Wagner et al., 2021).

With its unique demographic profile and rapidly evolving health landscape, Kiambu County presents a valuable case study for investigating CVD in women. This region has experienced significant lifestyle changes due to rapid urbanisation, which contributes to rising CVD rates (Wagner et al., 2021). While national data, such as that from the World Heart Federation (2019), highlights concern about CVD risk factors among Kenyan women, specific data for Kiambu County is limited. To address these gaps, the study looked at the sociodemographic, psychosocial, dietary, health literacy, and clinical factors associated with women's cardiovascular health in Kiambu County, Kenya.

"The study's sociodemographic analysis revealed that younger individuals aged 19-43 years were more likely to be diagnosed with CVD (19.5%)"

Problem Statement

Cardiovascular diseases (CVDs) are the leading cause of death globally, with women, particularly in low- and middle-income countries, bearing a disproportionate burden due to socioeconomic, psychosocial, and gender-specific factors. Despite the availability of modifiable risk predictors and

global advancements in prevention and treatment, CVD-related mortality continues to rise in sub-Saharan Africa, including Kenya, where women show higher CVD mortality rates than men. Existing prediction models often lack gender sensitivity and are not well adapted to diverse populations, leading to gaps in effective diagnosis, prevention, and intervention. Misconceptions about CVD as a male-dominated condition, both in the public and medical communities, further hinder appropriate care for women. Therefore, this research sought to address the increasing CVD burden—especially among women—by examining sociodemographic and psychosocial risk factors to inform more inclusive and context-specific prevention strategies.

Main Objective

To evaluate sex specific and psychosocial risk factors of cardiovascular disease among women living in Kiambu, Kenya

Specific Objectives

i. To assess the effect of clinical factors on cardiovascular disease among women in Kiambu, Kenya
ii. To examine the psychosocial factors' effect on cardiovascular disease among women in Kiambu, Kenya
iii. To determine the effect of socioeconomic factors on cardiovascular disease among women in Kiambu, Kenya

2.0 Materials and Methods

Study Design

This study used a cross-sectional survey research design.

Study Area and Participants

The study targeted female patients from Kiambu and Thika Level 5 hospitals, the two key referral centres in Kiambu County, Kenya.

Sample and Sampling Techniques

The sample size was determined using Mugenda and Mugenda's (2013) formula, which is suitable for estimating population proportions. The calculation was based on the estimated CVD prevalence in the population, with a 5% margin of error and 95% confidence level. This method yielded the required sample size of 400 participants. Simple random sampling was used to ensure broad representation across different age groups and health profiles. This method allowed for an equal chance of selection for all eligible participants, ensuring that women across diverse demographic and clinical backgrounds were included in the study. Inclusion criteria were women aged 19 to 94 who consented to participate, with exclusion criteria being those with severe cognitive impairment that would prevent questionnaire completion.

Ethical Considerations

Participants provided informed consent before data collection. Approval was obtained from the Kenya Methodist University Institutional Scientific Ethics Review Committee, the National Council for Science, Technology, and Innovation (NACOSTI), and the Kiambu County government.

Data Collection and Statistical Analysis

Data were collected using structured questionnaires that addressed sociodemographic, psychosocial, dietary, clinical, and health literacy factors. The questionnaires were pretested for clarity and reliability. Trained research assistants administered the questionnaires to target

participants at the selected hospitals. Data was entered into a database and analysed using the Statistical Package for Social Sciences (SPSS) version 27. Descriptive statistics summarised the study population's characteristics. Chi-square test was used to explore the association between categorical variables, with correlation analysis examining the relationship between continuous variables. Multiple regression analysis identified significant predictors of CVD and controlled for potential confounding factors. Logistic regression analysis assessed the odds ratios (OR) and 95% confidence intervals (CI) for significant predictors. Statistical significance was set at $p < 0.05$.

3.0 Results and Discussion

Response Rate

Out of the 436 questionnaires distributed, 400 were completed and returned, resulting in a response rate of 91%. This met the criteria and was considered satisfactory according to Mugenda and Mugenda (2013), who state that a response rate of 50% is deemed adequate for analysis and reporting; 60% is considered acceptable; and 70% or higher is regarded as excellent.

Sociodemographic and Clinical Factors

The sociodemographic characteristics such as age, education, employment, income, health cover and marital status of the study participants were examined to understand the prevalence of CVD, as shown in Table 1 below.

Table 1

Social Demographic characteristics of the study participants

Characteristics	Description	% (n=400)
Age (Years)	19-43	52 (208)
	44-68	38.25 (153)
	69-94	9.75 (39)
Education	Non-Formal Education	13.50 (54)
	Primary	19.25 (77)
	Secondary	32.75 (131)
	Tertiary	34.50 (138)
Employment	Formally employed	19.5 (78)
	Self employed	46.25 (185)
	Unemployed	34.25 (137)
Daily Income (KES)	>1,000	25.25 (101)
	500-1,000	34.50 (138)
	<500	40.25 (161)
Health Insurance	No	21.50 (86)
	Yes	78.50 (314)
Marital Status	Married	42.75 (171)
	Separated/divorced	19.50 (78)
	Single	22.00 (88)
	Widow	15.75 (63)

Table 1 indicates that the study population primarily consisted of women aged 19-43 years, representing 52% of the sample. Educational attainment revealed that 34.5% of participants had a tertiary education, while 32.75% had completed secondary education. Nearly half (46.25%) were self-employed, and 40.25% reported daily earnings of less than KES 500. Additionally, 78.5% of participants had health insurance. Regarding marital status, 42.75% were married, and 15.75% were widowed.

Clinical data of the study participants were also assessed, and the results are presented in Table 2 below.

Table 2

Clinical Factor Characteristics of the study participants

Characteristic	Description	% (n=400)
Blood Pressure Level	Normal (≤120/80)	25.0 (100)
	Elevated (120- 129/80)	11.0 (44)
	Hypertension stage 1 (130-139/90)	14.5 (58)
	Hypertension stage 2 (140-179/90)	46.8 (187)
Hypertension Diagnosis	Yes	34.00 (136)
	No	66.00 (264)
History of Heart Attack	Yes	23.50 (94)
	No	76.50 (306)
Family History of Cardiovascular Disease	Yes	37.75 (151)
	No	62.25 (249)
Diabetes Diagnosis	Yes	33.50 (134)
	No	66.50 (266)
Body Mass Index (BMI)	Underweight (<18.5)	22 (5.5)
	Normal Range (18.5-24.9)	33.75 (135)
	Overweight (25.0- 29.9)	29.25 (117)
	Obese (>30)	31.5 (126)
Hormonal Imbalance Diagnosis	Yes	14.3 (57)
	No	85.8 (343)
Menopause	Yes	32.5 (130)
	No	67.3 (269)
	None	84.0 (336)
Pregnancy Disorder	Gestational Diabetes	4.8 (19)
	Gestational Diabetes & Preterm Delivery	0.3 (1)
	Gestational Hypertensive Disorder	6.0 (24)
	Gestational Hypertension & Diabetes Disorder	1.0 (4)
	Gestational Hypertensive Disorder & Preterm Delivery	0.5 (2)
	Preterm delivery	3.5 (14)

Findings indicate that 46.8% of participants were diagnosed with stage-2 hypertension, and 33.5% had diabetes. A history of heart attack was reported by 23.5% of the women. The body mass index (BMI) data revealed a substantial prevalence of overweight and obesity, with

29.25% categorized as overweight and 31.5% classified as obese. Additionally, 14.3% of participants were identified as having hormonal imbalances.

Psychosocial Factors and Stress

The study sought to establish the psychosocial and stress factors among study participants, and presented the results in Table 3 below;

Table 3

Psychosocial Characteristics of the Study Participants

Characteristic	% (n)
Depression Diagnosis	
No	78.5 (314)
Yes	21.5 (86)
Frequency of Routine Physical Exercise	
1-2 times a day	69.25 (277)
Daily	10.00 (40)
3-6 times a Week	8.75 (35)
Rarely/ Never	0.25 (1)
Smoked Past or Present	
No	84.25 (337)
Yes	15.75 (63)
Taken Alcohol Past or Present	
No	86.43 (344)
Yes	13.57 (54)
Stress Level	
6-15	16.50 (66)
16-25	75.50 (302)
26-35	8.00 (32)

Findings indicate that 21.5% of women were diagnosed with depression. Daily physical exercise was reported by 10.00% of participants. Smoking and alcohol use were reported by 15.75% and 13.57% of participants, respectively. Stress levels among the participants varied significantly, with 75.50% experiencing moderate to high stress (16-25). These findings align with existing literature on the complex interplay between psychosocial factors and cardiovascular disease outcomes. Harshfield et al. (2020) emphasised the bidirectional relationship between depression and cardiovascular disease, underscoring the need for strategic interventions to address mental health in the context of cardiovascular risk.

Similarly, Dempsey et al. (2020) found a high correlation between sedentary behaviour and increased risk of cardiovascular disease, highlighting the importance of promoting regular physical activity as a preventive measure.

Dietary Habits and Health Literacy

The dietary habits and health literacy factors among research participants were investigated, and the results are presented in Table 4 below.

Table 4

Dietary habits of the study participants

Characteristics	% (n)
Source of Energy for Cooking	
Gaseous Fuels (Gas)	41.3 (165)
Mixed Fuels (Combination of Gas and Solid Fuels)	10.3(41)
Other Fuels (Electricity and Kerosene)	7.5 (30
Solid Fuels (Firewood, Charcoal, Biomass)	41.0(164)
Cooking Space Ventilation	
Both	24.25 (97)
Closed space with limited ventilation	24.25 (97)
None	15.50 (62)
Open flame	36.00 (144)
Consume Refined Food	
At least once a day	52.50 (210)
At least once a week	33.50 (134)
At least once a month	4.25 (17)
Never	9.75 (39)
Consume Whole Grains	
At least once a day	40.85 (163)
at least once a week	37.59 (150)
At least once a month	8.52 (34)
Never	13.03 (52)
Consume Red Meat	
At least once a day	28.21 (112)
At least once a week	34.26 (136)
Atlas once a month	24.18 (96)
Never	13.35 (53)
Consume Greens	
At least once a day	79.75 (319)
At least once a week	15.50 (62)
At least once a month	1.75 (7)
Never	3.00 (12)
Consume Fried Foods	
At least once a day	43.36 (173)
At least once a week	34.84 (139)
At least once a month	12.53 (50)
Never	9.27 (37)

Results in Table 4 show that 41% of the study population relied on solid fat for cooking. Regarding dietary intake, refined foods were consumed daily by 52.5% of participants. While 79.75% reported consuming greens daily, fried foods were also frequently consumed by 43.36% of participants each day.

Regarding health education factors, characteristics of the study participants, and the findings were summarised in Table 5.

Table 5

Health Education Factor Characteristics of the study participants.

Characteristics	% (n= 400)
Know any cardiovascular disease	
No	68.25 (273)
Yes	31.75 (127)
Ever Received Nutritional Education?	
No	67.50 (270)
Yes	32.50 (130)
Aware of the recommended Dietary guidelines for a healthy heart?	
No	71.75 (287)
Yes	28.25 (113)
Have you made any changes in your diet to improve heart health?	
No	80.50 (322)
Yes	19.50 (78)
Dietary Changes made	
Dietary Habits	8.3 (33)
Exercise and Physical Activity	1.5 (6)
Fat Intake Reduction	2.5 (10)
Salt Intake Reduction	5.8 (23)

Findings in Table 5 illustrate that a significant number of women in Kiambu County lack knowledge about cardiovascular diseases (68.25%) and have not received nutritional education (67.50%). Moreover, most participants were unaware of recommended dietary guidelines for a healthy heart (71.75%) and had not yet made dietary changes to improve heart health (80.50%). Among those who made dietary changes, most focused on nutritional habits (8.3%).

The study further sought to assess the effects of health literacy on cardiovascular disease diagnosis and presented the results in Table 6 below.

Table 6

The effects of Health Literacy on cardiovascular disease diagnosis

Health Education Factor	Chi-square (X)	*P-Value*
Know any cardiovascular disease	7.274	0.007
Ever Received nutrition education?	0.464	0.496
Aware of the recommended Dietary guidelines for a healthy heart?	3.915	0.048
Have you made any changes in your diet to improve heart health?	2.89	0.089

(P<0.05 values are significantly different)

Findings in Table 6 revealed that 31.75% of participants knew cardiovascular diseases (Table 6), 32.5% had received nutritional education, and 28.25% were aware of dietary guidelines for heart

health. However, only 19.5% reported making specific dietary changes to improve cardiovascular health. Statistical analysis indicated that knowledge of cardiovascular diseases ($\chi^2 = 7.274$, $p = 0.007$) and awareness of dietary guidelines ($\chi^2 = 3.915$, $p = 0.048$) were significantly associated with CVD diagnosis. These findings suggest that targeted health literacy interventions focusing on specific cardiovascular disease knowledge and dietary recommendations may be more effective than general nutritional education or self-reported dietary changes ($\chi^2 = 0.464$, $p = 0.496$; $\chi^2 = 2.89$, $p = 0.089$, respectively). Li et al. (2015) emphasise the intricate relationship between dietary habits and cardiovascular health, underscoring the importance of dietary patterns over individual foods.

4.0 Conclusion

The study's sociodemographic analysis revealed that younger individuals aged 19-43 years were more likely to be diagnosed with CVD (19.5%). There was a significant prevalence of hypertension (31.3%) and diabetes (33.5%) among participants. Psychosocial factors also exhibited considerable prevalence, with 13.8% of participants diagnosed with depression, and 31.5 % reporting high stress levels. Dietary patterns indicated a high consumption of refined foods (24%) and fried foods (21%). Additionally, 27.5% of participants lacked knowledge about CVD, and 29.8% had not received nutritional education, as determined through cross-tabulation with CVD diagnoses.

5.0 Recommendations

The study recommends that the Kiambu County Department of Health Services prioritize targeted health literacy interventions and comprehensive public health strategies to address hypertension, diabetes, and psychosocial stress among women. The findings underscore the necessity for localised approaches for effective management of cardiovascular health in low- and middle-income countries (LMICs). By implementing public health programs that specifically mitigate CVD risks and improve health outcomes, the department can significantly enhance the well-being of women in Kiambu County and similar regions.

References

Benjamin, Virani, S. S., Alonso, A. E. J., et al. (2020). *Heart disease and stroke statistics—2020 update: A report from the American Heart Association*. *Circulation, 141*(9), e139–e596. https://doi.org/10.1161/CIR.0000000000000757

Bruno, R. M., Nilsson, P. M., Engström, G., Wadström, B. N., Empana, J.-P., Boutouyrie, P., & Laurent, S. (2020). Early and Supernormal Vascular Ageing. *Hypertension, 76*(5), 1616–1624. https://doi.org/10.1161/hypertensionaha.120.14971

Dempsey, P. C., Strain, T., Khaw, K.-T., Wareham, N. J., Brage, S., & Wijndaele, K. (2020). *Prospective associations of accelerometer-measured physical activity and sedentary time with incident cardiovascular disease, cancer, and all-cause mortality. Circulation, 141*(13) Garcia, M., Mulvagh, S. L., Bairey Merz, C. N., Buring, J. E., & Manson, J. E. (2016). Cardiovascular Disease in Women. *Circulation Research, 118*(8), 1273–1293. https://doi.org/10.1161/circresaha.116.307547

Global Health Data Exchange. (2019). *GBD*

Results Tool | GHDx. Healthdata.org. http://ghdx.healthdata.org/gbd-results-tool

Gomez-Delgado, F., Katsiki, N., Lopez-Miranda, J., & Perez-Martinez, P. (2020). Dietary habits, lipoprotein metabolism and cardiovascular disease: From individual foods to dietary patterns. *Critical Reviews in Food Science and Nutrition*, *61*(10), 1651–1669. https://doi.org/10.1080/10408398.2020.1764487

Garcia, S., Casimiro, S., & Antunes-Ferreira, N. (2016). *A case study of leprosy from the Luís Lopes Collection, MUHNAC, Lisbon*. ResearchGate. https://www.researchgate.net/publication/330854707_Garcia_et_al_2016_A_case_study_of_leprosy_from_the_Luis_Lopes_Collection_MUHNAC_Lisbon

Harshfield, E. L., Pennells, L., Schwartz, J. E., Willeit, P., Kaptoge, S., Bell, S., et al. (2020). Depression symptoms, cardiovascular disease and mortality in diverse global populations. *JAMA Psychiatry*, *77*(10), 1052–1063. https://doi.org/10.1001/jamapsychiatry.2020.1351

Kengne, A. P., June-Rose McHiza, Z., Amoah, A. G. B., & Mbanya, J.-C. (2013). Cardiovascular diseases and diabetes as economic and developmental challenges in Africa. *Progress in Cardiovascular Diseases*, *56*(3), 302–313. https://doi.org/10.1016/j.pcad.2013.10.011

Kivimäki, M., & Steptoe, A. (2018). Effects of stress on the development and progression of cardiovascular disease. *Nature Reviews Cardiology*, *15*(4), 215–229. https://doi.org/10.1038/nrcardio.2017.189

Li, Y., Hruby, A., Bernstein, A. M., Ley, S. H., Wang, D. D., Chiuve, S. E., & Hu, F. B. (2015). Saturated fats compared with unsaturated fats and sources of carbohydrates in relation to risk of coronary heart disease: A prospective cohort study. *Journal of the American College of Cardiology*, *66*(14), 1538–1548. https://pubmed.ncbi.nlm.nih.gov/26429077/

Mosca, L., Benjamin, E. J., Berra, K., Bezanson, J. L., Dolor, R. J., Lloyd-Jones, D. M., Newby, L. K., Piña, I. L., Roger, V. L., Shaw, L. J., Zhao, D., Beckie, T. M., Bushnell, C., D'Armiento, J., Kris-Etherton, P. M., Fang, J., Ganiats, T. G., Gomes, A. S., Gracia, C. R., & Haan, C. K. (2011). Effectiveness-Based Guidelines for the Prevention of Cardiovascular Disease in Women—2011 Update. *Circulation*, *123*(11), 1243–1262. https://doi.org/10.1161/cir.0b013e31820faaf8

Mozaffarian, D., Benjamin, E. J., Go, A. S., Arnett, D. K., Blaha, M. J., Cushman, M., Das, S. R., de Ferranti, S., Després, J.-P., Fullerton, H. J., Howard, V. J., Huffman, M. D., Isasi, C. R., Jiménez, M. C., Judd, S. E., Kissela, B. M., Lichtman, J. H., Lisabeth, L. D., Liu, S., Mackey, R. H., … American Heart Association Statistics Committee and Stroke Statistics Subcommittee. (2016). Heart disease and stroke statistics—2016 update: A report from the American Heart Association. *Circulation*, *133*(4), e38–e360.https://doi.org/10.1161/cir.0000000000000350

Mugenda, A. and O. Mugenda, 2013. Research methods: Quantitative and qualitative approaches. Nairobi: ACTS Press

Murray, C. J. L., & Lopez, A. D. (2013). Measuring the Global Burden of Disease. *New England Journal of Medicine*, *369*(5), 448–457. https://doi.org/10.1056/nejmra1201534

Osborne, M. T., Shin, L. M., Mehta, N. N., Pitman, R. K., Fayad, Z. A., & Tawakol, A. (2020). Disentangling the Links Between

Psychosocial Stress and Cardiovascular Disease. *Circulation: Cardiovascular Imaging*, *13*(8). https://doi.org/10.1161/circimaging.120.010931

Virani, S. S., Alonso, A., Benjamin, E. J., Bittencourt, M. S., Callaway, C. W., Carson, A. P., Chamberlain, A. M., Chang, A. R., Cheng, S., Delling, F. N., Djousse, L., Elkind, M. S. V., Ferguson, J. F., Fornage, M., Khan, S. S., Kissela, B. M., Knutson, K. L., Kwan, T. W., Lackland, D. T., & Lewis, T. T. (2020). Heart Disease and Stroke Statistics—2020 Update. *Circulation*, *141*(9). https://doi.org/10.1161/cir.0000000000000757

Vogel, B., Acevedo, M., Appelman, Y., Bairey Merz, C. N., Chieffo, A., Figtree, G. A., Guerrero, M., Kunadian, V., Lam, C. S. P., Maas, A. H. E. M., Mihailidou, A. S., Olszanecka, A., Poole, J. E., Saldarriaga, C., Saw, J., Zühlke, L., & Mehran, R. (2021). The Lancet Women and cardiovascular disease Commission: reducing the global burden by 2030. *The Lancet*, *397*(10292). https://doi.org/10.1016/s0140-6736(21)00684-x

Wagner, R. G., Crowther, N. J., Micklesfield, L. K., Boua, P. R., Nonterah, E. A., Mashinya, F., Mohamed, S. F., Asiki, G., Tollman, S., Ramsay, M., & Davies, J. I. (2021). Estimating the burden of cardiovascular risk in community dwellers over 40 years old in South Africa, Kenya, Burkina Faso and Ghana. *BMJ Global Health*, *6*(1), e003499. https://doi.org/10.1136/bmjgh-2020-003499

World Heart Federation. (2019). *Kenya Country Report* [Country Report]. World Heart Federation. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8756039/