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The use of over the counter aspirin as prophylaxis for cardiovascular diseases among adult people in Saudi Arabia

Mohammad R Alshammri[1], **Noora O Altamimi**[2*], **Reema M Al Dera**[2], **Danah H Almohaimeed**[2], **Khawlah S Alshahrani**[2], **Atheer T Al Otaibi**[2]

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Authors' Affiliation:
[1]Assistant Professor of Medicine, College of Medicine, Imam Mohammad Ibn Saud Islamic University, Riyadh, Saudi Arabia
[2]College of medicine, Imam Mohammad Ibn Saud Islamic University, Riyadh, Saudi Arabia

Contact Information

Mohammad R. Alshammri	mralshammri@imamu.edu.sa
Noora O. Altamimi	NooraAltamimi97@gmail.com
Reema M. Al Dera	Reemaalderaa2@gmail.com
Danah H. Almohaimeed	Danahamad404@gmail.com
Khawlah S. Alshahrani	khawlahsafar@gmail.com
Atheer T. Al Otaibi	Atheer_talal97@hotmail.com

[*]**Corresponding author**
MBBS, College of Medicine, Imam Mohammad Ibn Saud Islamic University, Riyadh, Saudi Arabia
Email: Nooraaltamimi97@gmail.com

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ABSTRACT

Objectives: Our aims to assess knowledge and attitudes regarding over-the-counter (OTC) aspirin use as prophylaxis from cardiovascular disease among adult population in kingdom of Saudi Arabia, to assess the factors associated with aspirin use in adults with cardiovascular disease. *Method:* This research paper (cross-sectional) was carried out in all Saudi Arabia regions. A self-administered electronic questionnaire used as a data collection tool. *Results:* total of 876 participated in this study, 50.6% males and 26.7% between 31-40 years. 35.7% of the participants reported taking OTC medications and 17.2% reported using aspirin. Only 45% of those taking aspirin reported taking it after the prescription. Additionally, we found higher prevalence of using aspirin in hypertensive patients (41.4%vs13.1%, P=0.000), diabetes mellitus (33.3% vs 14.8%, P=0.000), heart condition (55.6% vs 14.0%, P=0.000), hypercholesterolemia (36.6% vs 12.6%, P=0.000). *Conclusion:* 17.2% of participants used aspirin, 55 % used it with prescription. Aspirin use was high among old people with lower educational levels and those with CVD risk factors.

Keywords: Adults, Aspirin, CVD, OTC, Prophylaxis.

1. INTRODUCTION

Aspirin is an essential non-steroidal anti-inflammatory drug (NSAIDs) which is considered as important drugs in decreasing the mortality and morbidity of cardiovascular disease (Ittaman et al., 2014). Also, it is used to relieve pain, swelling, and manage the risk of heart disease (Boakye et al., 2021). Aspirin inhibits cyclooxygenase 1 (COX-1) and modulates cyclooxygenase 2 (COX-2) enzyme activity (Zimmermann et al., 2018). It is considered to be binding irreversibly compared to other types of 'NSAID' like ibuprofen which are known to bind reversibly to the enzyme (Meek et al., 2010). It also irreversibly inhibits thromboxane A2 on platelets, preventing platelet aggregation (Christiansen et al., 2021).

The diseases that impact the heart and its blood vessels are numerous and have been linked to the term cardiovascular disease (CVD), these diseases include coronary artery disease, myocardial infarction, congenital heart diseases and others (Stewart et al., 2017). Even though long-term use of aspirin had major side effects, for example, stomach or gut irritation, indigestion, nausea, and risk of bleeding in the brain or stomach (Vonkeman et al., 2010; Mc Quaid et al., 2006), It is still accessible as an over-the-counter medication.

This paper is aimed to measure the knowledge and attitude regarding over-the-counter (OTC) aspirin use as prophylactic for cardiovascular disease among the adult population in Saudi Arabia also, estimating of aspirin use influence among the adult population with CVD associated with using aspirin.

2. MATERIALS AND METHODS

This cross-sectional study was conducted from July 2021 to December 2021 in Saudi Arabia after obtaining approval from the institutional review board (IRB) of Imam Mohammad Ibn Saud Islamic University. Individuals were informed of the study's aims and obtained consent. Data confidentiality and privacy were guaranteed to all participants. The questionnaire was performed by the authors after doing a literature review to determine the most significant factors observed in relevant studies. A simple random sample technique was approached. The data collection tool was a self-administrated electronic questionnaire which was distributed via social media. The questionnaire was self-developed as two sections: first part dealing with socio-demographic data and the second section included aspirin-related questions. The analysis was done using the SPSS statistics (Statistical Package for Social Sciences). The qualitative variables present as percentages and frequencies, while the central tendency calculates continuous variables. Chi-test and t-test were used for determining the relation between prevalence of aspirin use and demographic factors and health factors of the participants. Statistically, a p-value less than 0.05 (typically ≤ 0.05) is considered significant.

3. RESULTS

We obtained eight hundred seventy-six responses in this study. Among our sample, the percentage of male participants were (50.6%) while females (49.4%). 26.7% between the age of 31-40 years old, and only 21.5 % were between 18-25 years old. The majority of our responses (68.9%) were married. Furthermore, 34.2 % of the responses were from the eastern region. Considering the educational level of the participants, 55.3 % of them had a college degree (baccalaureate), and 39.8 % had a secondary or diploma. Additionally in our sample, 49.3 % were employed, while 26.5 % were unemployed (Table 1).

Table 1 Demographic factors of the participants (N=876)

		Count	Column N %
Gender	Male	433	49.4%
	Female	443	50.6%
Age	18-25	188	21.5%
	26-30	110	12.6%
	31-40	234	26.7%
	40-50	179	20.4%
	> 50	165	18.8%
Marital status	Single	272	31.1%
	Married	604	68.9%
Region	Northern region	135	15.4%
	Southern region	165	18.8%
	Central region	139	15.9%

	Eastern region	300	34.2%
	Western region	137	15.6%
Educational level	Not-educated	11	1.3%
	Primary or intermediate school	32	3.7%
	Secondary/diploma	349	39.8%
	Bachelor	484	55.3%
Profession	Not working	232	26.5%
	Students	146	16.7%
	Employee	432	49.3%
	Free- working	66	7.5%

We found that approximately 53% practise different types of exercise for 30 minutes daily. The widespread of high blood pressure (hypertension), diabetes mellitus, and hypercholesterolemia were 14.6 %, 11.0 % and 12.9 %, respectively. Concerning their smoking habits, 17.5 % of the participants were smokers; 10.3 % of them smoked every day, while 7.2% occasionally. Further, 46.7% of them had a normal body weight (body mass index 'BMI'), whereas obesity, overweight and underweight were 4.7%, 34.6% and 14.0%, respectively. Interestingly, 28.5 % in our sample reported having a family background of heart conditions including heart attack, angina, or stroke (Table 2).

Table 2 General health characteristics of the participants.

		Count	Column N %
Practising any exercise for 30 minutes per day	No	415	47.4%
	Yes	461	52.6%
Hypertension	No	671	76.6%
	Yes	128	14.6%
	No idea	77	8.8%
Diabetes mellitus	No	735	83.9%
	Yes	96	11.0%
	No idea	45	5.1%
Heart conditions	No	774	88.4%
	Yes	36	4.1%
	No idea	66	7.5%
previous stroke	No	868	99.1%
	Yes	8	0.9%
	No idea	0	0.0%
Hypercholesterolemia	No	629	71.8%
	Yes	113	12.9%
	No idea	134	15.3%
Smoking	No	723	82.5%
	Yes, sometimes	63	7.2%
	Yes, every day	90	10.3%
BMI	Underweight	123	14.0%
	Normal	409	46.7%
	Overweight	303	34.6%
	Obese	41	4.7%
Do you have a family	No	626	71.5%

background of heart disease (heart attack/ angina/ stroke)?	Yes	250	28.5%

The result showed that 35.7 % of individuals use over-the-counter medications for the minor conditions and 17.2 % of them used aspirin. Interestingly, 45 % of them took aspirin after receiving a prescription from their physician (Figure 1). 40.4% of patients who's taking aspirin used a daily dose of 75 mg, 33.1% used 81 mg, and 26.5% used a daily dose of 100 mg. In addition, 2.5 % of them reported switching to different doses on their own. Further, 47.3% of them have been using aspirin for more than 12 months and 29.3% for less than one month. Concerning the time of taking aspirin, around 48.3 % stated no specific time for taking aspirin while 25.2 % take aspirin after meals. Approximately half of our responses reported aspirin use for pain reliever, and 43% of them use it as prophylactic therapy from blood clots. 52.3% of the participants adhered to the treatment plan (Table 3).

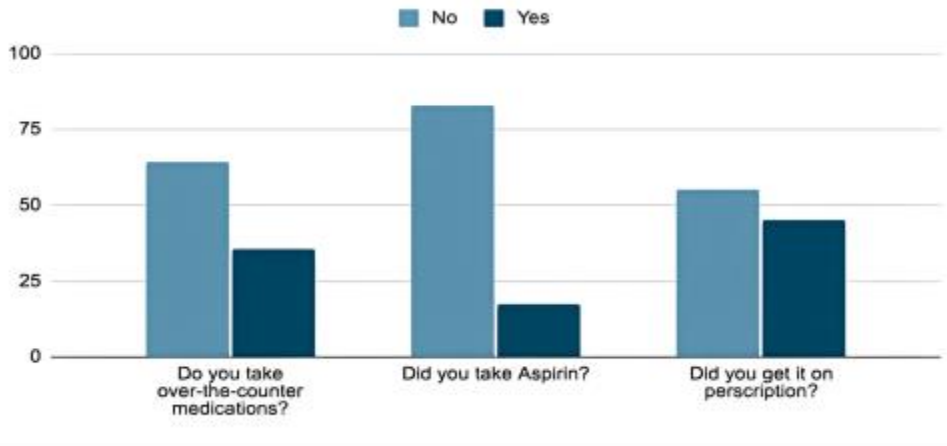

Figure 1 the prevalence of using over-the-counter medications including Aspirin

Table 3 Information considering using of Aspirin among patients reported using of Aspirin (N=151)

		Count	Column N %
Dose of aspirin	75 Mg	61	40.4%
	81 mg	50	33.1%
	100 mg	40	26.5%
Have you ever Replaced a dose of aspirin?	No	117	77.5%
	Yes	34	22.5%
How long have you been using aspirin?	< month	44	29.3%
	1-6 months	22	14.7%
	6-12 months	13	8.7%
	More than 12 months	71	47.3%
What time to take Aspirin?	Before meal	18	11.9%
	After meals	38	25.2%
	Bedtime	22	14.6%

	No particular time	73	48.3%
Reason for using Aspirin	Pain reliever	72	47.7%
	Prophylaxis from blood clots	65	43.0%
	Antipyretic	7	4.6%
	Other	7	4.6%
Are you committed to treatment?	No	72	47.7%
	Yes	79	52.3%

40.5% of the sample was aware of the aspirin side effect. Nausea and vomiting was reported as the most common adverse effect associated while taking aspirin (54.4%), heartburn (43.2%), increased stomach acid secretion, and stomach cramps (28.1%) (Figure 2). In addition, 64.9 % of the people are aware that aspirin cannot be used by a person who is allergic to aspirin, while 49.4 % know that aspirin is not good to be used with people suffering from bleeding disorders. From the sample 51.9 % consider aspirin as a contraindication drug in pregnancy, as well as 39.8 % in lactating women and 39.1 % for people with digestive disorder (Figure 3).

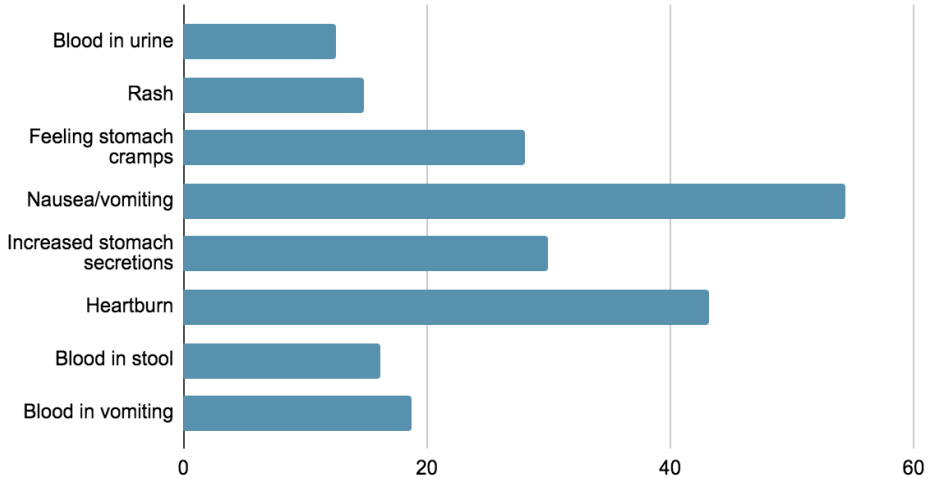

Figure 2 The most common side effect of Aspirin known by participants

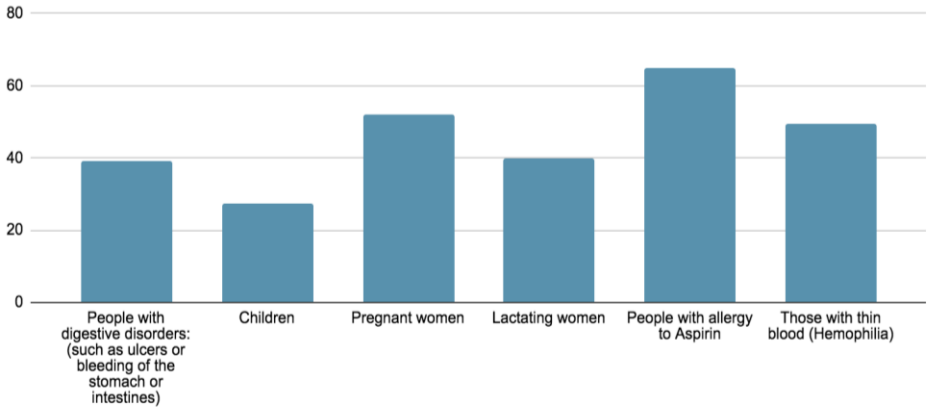

Figure 3 The participants' awareness toward those who should not take Aspirin

We noticed that gender had a substantial impact on aspirin use, with females tends more than males (43.6 percent vs 27.7%, P=0.000). But males reported a greater prevalence of using aspirin (20.3 percent vs 14.2 percent, P=0.017) and approximately half of males used aspirin after obtaining a medical prescription (48.9% vs 39.7%, P=0.000). Furthermore, the result showed that aspirin usage is higher with age incensement accounting for 25.5 percent in older participants. They also have a tendency to take aspirin only after their physicians have prescribed it. Nevertheless, we found that higher education was related with a reduced use of non-prescribed medications and a lower prevalence of aspirin use (P=0.000, 0.015). Whereas, the result showed that practicing exercise did not affect the prevalence of using aspirin (Table 4).

Table 4 The relation between prevalence of using aspirin and demographic factors.

		Do you take over-the-counter medications?		Did you take Aspirin?		Did you get it on Prescription?	
		No	Yes	No	Yes	No	Yes
		Row N %	Row N %	Row N %	Row N %	Row N %	Row N %
Gender	Male	72.3%	27.7%	79.7%	20.3%	51.1%	48.9%
	Female	56.4%	43.6%	85.8%	14.2%	60.3%	39.7%
	P-value	.000*		.017*		.004*	
Age	18-25	65.4%	34.6%	93.6%	6.4%	75.0%	25.0%
	26-30	71.8%	28.2%	88.2%	11.8%	53.8%	46.2%
	31-40	65.4%	34.6%	81.6%	18.4%	67.4%	32.6%
	40-50	58.1%	41.9%	77.1%	22.9%	58.5%	41.5%
	> 50	63.0%	37.0%	74.5%	25.5%	33.3%	66.7%
	P-value	.196		.000*		.012*	
Educational level	Not-educated	45.5%	54.5%	54.5%	45.5%	60.0%	40.0%
	Primary or intermediate school	40.6%	59.4%	75.0%	25.0%	62.5%	37.5%
	Secondary/diploma	73.1%	26.9%	86.0%	14.0%	55.1%	44.9%
	Bachelor	59.9%	40.1%	81.6%	18.4%	53.9%	46.1%
	P-value	.000*		.015*		.965[b]	
Practising any exercise for 30 minutes per day	No	63.1%	36.9%	84.3%	15.7%	60.0%	40.0%
	Yes	65.3%	34.7%	81.3%	18.7%	51.2%	48.8%
	P-value	.505		.242		.280	

Furthermore, we discovered the widespread aspirin use is remarkably high in hypertensive patients (41.4 percent vs 13.1 percent, P=0.000), diabetic patients (33.3 percent vs 14.8 percent, P=0.000), heart patients (55.6 percent vs 14.0 percent, p=0.000), and

hypercholesterolemia patients (36.6 percent vs 12.6 percent, p=0.000). However, smokers, overweight and obese patients, and those with a familial background heart disease were demonstrating more likely to take aspirin (Table 5).

Table 5 The relation between using of Aspirin and health state of the participants

		Do you take over-the-counter medications?		Did you take aspirin?		Did you get it on prescription?	
		No	Yes	No	Yes	No	Yes
Hypertension	No	66.6%	33.4%	86.9%	13.1%	61.4%	38.6%
	Yes	55.5%	44.5%	58.6%	41.4%	43.4%	56.6%
	No idea	58.4%	41.6%	87.0%	13.0%	60.0%	40.0%
	P-value	.029*		.000*		.110	
Diabetes mellitus	No	64.6%	35.4%	85.2%	14.8%	65.1%	34.9%
	Yes	64.6%	35.4%	66.7%	33.3%	25.0%	75.0%
	No idea	57.8%	42.2%	77.8%	22.2%	40.0%	60.0%
	P-value	.647		.000*		.000*	
Heart conditions	No	65.2%	34.8%	86.0%	14.0%	59.3%	40.7%
	Yes	72.2%	27.8%	44.4%	55.6%	20.0%	80.0%
	No idea	48.5%	51.5%	65.2%	34.8%	65.2%	34.8%
	P-value	.014*		.000*		.003*	
Had previous stroke	No	64.2%	35.8%	82.9%	17.1%	56.1%	43.9%
	Yes	75.0%	25.0%	62.5%	37.5%	0.0%	100.0%
	No idea	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	P-value	.525		.127		.053	
Hypercholesterolemia	No	65.7%	34.3%	87.4%	12.6%	58.2%	41.8%
	Yes	60.2%	39.8%	63.7%	36.3%	36.6%	63.4%
	No idea	61.2%	38.8%	76.9%	23.1%	71.0%	29.0%
	P-value	.386		.000*		.010*	
Smoking	No	64.5%	35.5%	85.1%	14.9%	53.7%	46.3%
	Yes, sometimes	57.1%	42.9%	66.7%	33.3%	61.9%	38.1%
	Yes, everyday	67.8%	32.2%	75.6%	24.4%	54.5%	45.5%
	P-value	.389		.000*		.787	
BMI	Underweight	78.0%	22.0%	88.6%	11.4%	50.0%	50.0%
	Normal	64.5%	35.5%	89.2%	10.8%	61.4%	38.6%

	Overweight	60.1%	39.9%	72.3%	27.7%	56.0%	44.0%
	Obese	51.2%	48.8%	78.0%	22.0%	22.2%	77.8%
	P-value	.001*		.000*		.187	
Do you have a familial background of heart disease (heart attack/ angina/ stroke)?	No	68.7%	31.3%	85.6%	14.4%	56.7%	43.3%
	Yes	53.2%	46.8%	75.6%	24.4%	52.5%	47.5%
	P-value	.000*		.000*		.610	

4. DISCUSSION

This study was conducted among eight hundred seventy-six adults of different ages, gender, regions, and medical histories. The prevalence of chronic conditions among our sample was 14.6% for hypertension, 11.0% for diabetes mellitus, and 12.9% for hypercholesterolemia. Additionally, 4.7% were obese and 34.6% overweight while the remaining 14% were underweight. According to a study done by Al Quaiz et al., (2021) the authors reported widespread diabetes mellitus, hypertension, hypercholesterolemia, and obesity were 22.3 %, 17 %, 52 %, 51 % respectively. Almost one-third documented that they were free to take OTC medication while 17.2 % of the people who participated documented using aspirin for different purposes but mainly for relief of pain and prophylaxis of blood clots with doses of 75 mg daily where 55 % of them used aspirin without prescription and for over a year. Bazargan et al., (2021) conducted a study among African American older adults, they estimated the use of low doses of aspirin as 37.2 % of which about 60% of aspirin users took aspirin without prescription, their prevalence was higher than our analysis.

However, this might be a result of the different population and age categories between studies where Bazargan et al., (2021) performed his study among African American races and between adults over 55 years old, while our study conducted among Saudi Arabian of different ages. In another study conducted by Stuntz et al., (2017) the authors estimated using a low dose of aspirin for prophylaxis from cardiovascular conditions in 2015 among the US population was 30.0 %. Although the continuous use of low dose aspirin can be beneficial it has been linked with many side effects and has been contraindicated in certain populations (Handa et al., 2018; Kosinski et al., 2018).

According to our study, lower than half (40.5 %) of the participants reported knowing the adverse effects of using aspirin. The main side effects reported a relationship with using aspirin were nausea and vomiting (54.4 %), then heartburn (43.2 %), followed by a rise in stomach acid secretion and stomach cramps (28.1%). In the Karami et al., (2018) study, the authors found that 84.7 % of the population did not know the negative effects of analgesics. The finding demonstrated a great number of participants knew that aspirin should be contraindicated in people with allergies to aspirin, haemophilia, pregnant women, and lactating women. Our result showed that males use aspirin with a prescription more than females. The similar result was previously documented in a study by Stuntz et al., (2017) who found that 23.5% of males used aspirin for primary CVS prophylaxis compared to 20.8% of females. However, females had more tendencies to use OTC aspirin than males (Hassan et al., 2001). Meanwhile, a study showed no appreciable variation between genders in using aspirin. However, it showed that females usually consume self-prescribed aspirin than males (Bazargan et al., 2021).

Furthermore, the age of participants has been remarkably related to aspirin consumption accounting for 25.5 % in participants more than fifty years old compared whereas it was 6.4% in participants between 18-25 years old. This rise could be due to the higher risk linked to using aspirin, as CVS is more common in elderly people than in younger people (Trinder et al., 2003). Similarly, Ansa et al., (2021) establishing the percentages CVD was considerably greater in older populations over 45 than younger participants, which was related to the prevalence of aspirin use being higher in older populations, which supports our findings. Other elements that influenced the prevalence of using aspirin include educational level where the higher the educational level, the lower the incidence of using aspirin. Aspirin is a well-known prescribed over-the-counter drug for cardiovascular disease prevention (Ittaman et al., 2014). As been mentioned previously the aspirin binds irreversibly meaning acetylation of cyclooxygenase (COX-1 enzyme) in platelets there for prostaglandins and thromboxane A2 will not be formed and consequently it will protect the heart, two potent promoters of platelet aggregation and vasoconstriction (Miner et al., 2007; Warner et al., 2011).

However, one systematic review did not show a significant difference in CVD incidence of people who use aspirin in comparison to people who didn't use it (Gelbenegger et al., 2019). There are many conditions that influence the risk of heart problems including hypertension, diabetes mellitus, dyslipidemia, being overweight and family history or previous incidence of CVD (Rosiek et al., 2016). According to our findings, the existence of any of them will significantly increases the prevalence of using

aspirin which reaches 41.4 % in hypertensive patients (43.4 % OTC), 33.3 % in diabetic patients (25 % OTC), 37.5 % in patients with previous stroke (0.0% OTC), and 36.3 % in those with high cholesterol levels (36.6 % OTC). In the study of Bazargan et al., (2021) the author confirmed our results showing the widespread use of Aspirin was greater in diabetic Mellitus and previous stroke patients and the same results were reported by Rodondi et al., (2008).

As in any study, the limitations of this article include the self-reported questionnaires which could lead to some personal bias especially in reporting their clinical conditions leading to misreporting the diseases, or weight. Additionally, this paper was online distributed which can result in sampling bias toward younger participants. However, this study -up to our knowledge- is the first studies to estimate the commons of aspirin usage in the Saudi Arabian population. In summary, the prevalence of using aspirin was 17.2 % among adults in Saudi Arabia, among whom 55 % used it with prescription. Aspirin use was higher in adults, older participants, with lower educational levels, and with any type of CVD risk factor including hypertension, diabetes, and obesity.

5. CONCLUSION

Aspirin is important to decrease the risks of cardiovascular disease. Our goal in this research paper is to assess knowledge and attitudes regarding over-the-counter aspirin use as prophylaxis from cardiovascular disease among the adult population in Saudi Arabia. The results show that aspirin is used by 17.2% of Saudi Arabian adults, and 55% used it with prescription.

Consent to participate

Informed consent was obtained from all the participants. The use of over the counter aspirin as prophylaxis for cardiovascular diseases among adult people in Saudi Arabia

Ethical approval

The Research Committee of Imam Mohammad Ibn Saud Islamic University, College of Medicine approved this study (Certificate no. 116-2021) and ensured the study's ethical conduct in 2021. The research objectives and aim, voluntary participation, right to autonomy and confidentiality, and the ability to withdraw from the study were explained to the participants, and they gave their informed consent.

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Conflicts of interest

The authors declare that there are no conflicts of interests.

Data and materials availability

All data associated with this study are present in the paper.

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