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Does daylight saving time lead to more myocardial infarctions?

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Abstract

Background: Daylight saving time (DST) is practiced in over 70 countries worldwide. Its assumed economic benefits have become subject of increasing controversy in the recent past, and, together with its likely negative impacts on health, have led to the decision to abolish DST in the EU and the USA. Transitions from and to DST disrupt the circadian rhythm and lead to measurable adverse effects. Among them, the incidence of acute myocardial infarction (AMI) is suspected to increase as a consequence of DST changes.
Objective: The aim of this study is to examine the relationship between DST transitions and the incidence of acute myocardial infarction based on the available literature.
Materials and methods: A systematic literature search in the MEDLINE database was performed. Studies were included that observed the AMI incidence after transitioning from or to DST and had a control period beyond or around the post-transitional weeks. Of 26 identified studies, 8 met the inclusion criteria. Results were interpreted with an emphasis on methodological differences, reported incidence rates, and subgroup analyses.
Results: Seven of the identified studies reported the incidence rate ratio (IRR), observed-to-expected ratio, or odds ratio, while one study only reported IRR values for the individual days and statistical significance levels for the transition weeks. Six studies reported an increased incidence after the spring shift, four of which were statistically significant. Three studies reported an increase after the autumn shift, of which two were statistically significant.
Conclusion: Several studies show increased AMI incidence rates following both spring and autumn DST shifts, yet results remain in part contradictory. Future research to establish a better understanding of the health implications of DST transitions is warranted, and the quantification of incidence rates should control for confounding factors.

Keywords
Seasons · Sympathetic nervous system · Circadian clocks · Incidence · Cardiology

Daylight saving time (DST) is still practiced in many countries, including the EU and the US. While its economic benefits are unclear, it measurably impairs health, as seen in more road traffic accidents [1–3] and workplace injuries [4], increased mental health problems [5], and decreased cognitive performance [6].

DST offsets the biological clock by 1 h, leading to circadian misalignment which is associated with higher sympathetic nervous system activity and increased inflammation [7], and is the likely cause of the increased incidence of cerebral and cardiovascular events after DST spring transitions, as was observed in increases in atrial fibrillation [8] and ischemic strokes [9].

Acute myocardial infarctions have also been found to increase modestly after DST shifts, but the available evidence is inconsistent. This study aims to summarize and evaluate the existing evidence on the effects of DST on AMI incidence.

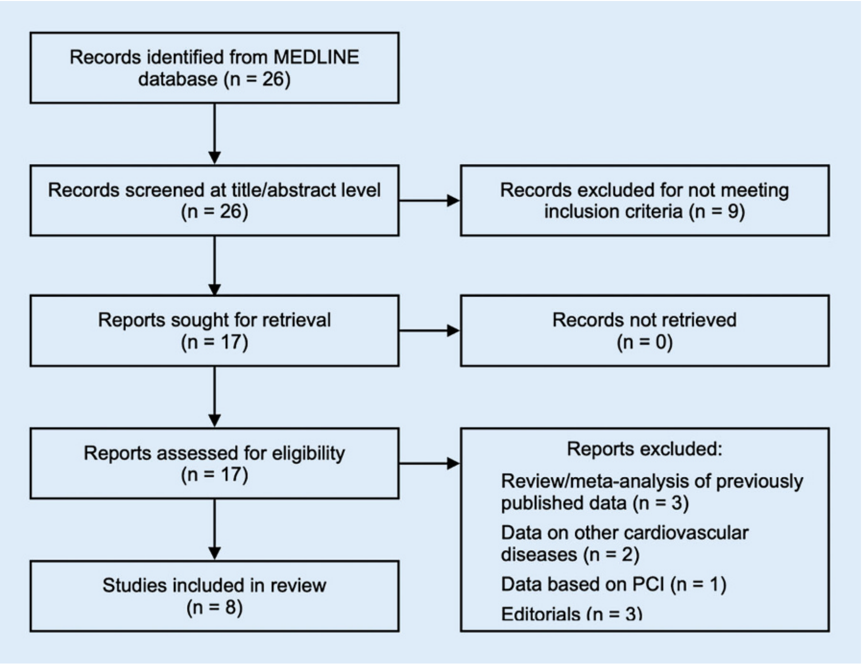

Fig. 1 ▲ Overview of the MEDLINE search process. Out of 26 records identified, 9 were excluded at title/abstract level, and 8 were excluded for being reviews, editorials, or focusing on other cardiovascular diseases or for being based on procedural data (e.g., percutaneous coronary interventions, *PCI*)

Methods

A systematic search of the evidence on the association between DST and AMI in MEDLINE was conducted using the PubMed database between May 20, 2023, and June 1, 2023, and included all available publications up to June 01, 2023. Studies were included if i) they observed the documented incidence of AMI among adult patients in the first week after transitioning from or to DST; ii) had a control period to compare AMI incidence to the week post-DST transition; and iii) did not derive the number of AMIs indirectly through a surrogate parameter, such as the number of percutaneous coronary interventions. No restrictions were made regarding text availability, article type, or language.

The following search terms were used: ("daylight saving time"[Title/Abstract] OR "DST"[Title/Abstract]) AND ("AMI"[All Fields] OR "myocardial infarction"[MeSH Terms]). Using the MeSH Terms function, the following variations of the keyword "myocardial infarction" were included in the search: "Infarction, Myocardial," "Infarctions, Myocardial," "Myocardial Infarctions," "Cardiovascular Stroke," "Cardiovascular Strokes," "Stroke, Cardiovascular," "Strokes, Cardiovascular," "Myocardial Infarct," "Infarct, Myocardial," "Infarcts, Myocardial," "Myocardial Infarcts," "Heart Attack," and "Heart Attacks." Search results were manually checked for relevance by initial review of title/abstract level (26 studies), followed by a detailed analysis against the inclusion criteria mentioned above. Of 26 identified studies, 8 were included in the review. Overviews of the selection process and the included studies are provided in ◘ Fig. 1 and ◘ Table 1, respectively. The analysis compares the results of reported AMI incidence rates and discusses potential methodological reasons for discrepancies.

Results

Reported findings on incidence rates

Eight studies [10–17] were identified that matched the search criteria. All studies were published between 2008 and 2022 and had a retrospective cohort design with data based on hospital discharge documents (S3, S4, S5, S7; see ◘ Table 1 for study assignment) or national registries (S1, S2, S6, S8). The sample size of AMI ranged from 935 to 71,992. The timespan of data covered in the investigations ranged from 1 to 25 years. Six studies were conducted in Europe (S1, S2, S4, S5, S6, S8), one in the US (S3), and one in Iran [S7]. All studies compared the AMI incidence rate (IR) during the observed period, i.e., after the DST time shift, with the AMI incidence rate in the control periods. Two studies did not report the size of the total patient group, but instead provided the number of patients with AMI among cases and controls (S1, S2), from which we derived the total sample size. Five studies (S1, S2, S3, S4, S5) calculated the incidence rate ratio (IRR) of the whole post-transitional week for the spring and autumn time transition, respectively. The IRR is the ratio of the AMI incidence rate in the observed period following the transition to the average of the AMI incidence rates during the control weeks. As a methodological variation, study S6 calculated the risk ratio of AMI for the post-transitional week compared to control periods instead of the IRR, and S7 calculated the IRR, but only reported statistical levels of significance, and no numerical values. Even though S8 did not mention IRR directly, it did calculate the ratio of observed to expected events (O/E).

For the spring shift, six of the seven studies (S1, S2, S3, S4, S5, S6) with numerical IRR data reported an IRR or equivalent ratio calculation of >1.0 after the transition into DST, thus indicating an increase in the AMI IR in the post-transitional period compared to control periods. Four of those studies reported statistically significant IR values: 1.051 (S1), 1.039 (S2), 1.17 (S3), and 1.15 (S4); S8 was the only study with an O/E of <1.0.

For the autumn shift, only three of seven studies that included data on weekly incidence rates reported an increase (S4, S6, S8). The AMI IRR or odds ratio in the post-transitional week in S4 and S6 was 1.19 and 1.025, respectively, and S8 reported an O/E ratio of 1.06. The increase in the incidence rate of AMI was only statistically significant in two of the three studies (S4, S8), one of which compared the AMI IR in the post-transitional week to that of all non-transitional weeks (S4). In all other studies, the IRRs were unremarkable, suggesting AMI incidence rates in the post-

Table 1 Overview of included studies. Studies are labelled as S1–S8 according to their date of publication

Study	First author [Year]	Country, study years	Total sample size	IR of post-transitional week [95% CI]		Weekday with highest IR	
				Spring	Autumn	Spring	Autumn
S1	Janszky et al. [2008]; [10]	Sweden 1987–2006	24,120	1.051 [1.032–1.071]	0.985 [0.969–1.002]	Tuesday	Friday
S2	Janszky et al. [2012]; [11]	Sweden 1995–2007	7300	1.039 [1.003–1.075]	0.995 [0.965–1.026]	NR	NR
S3	Jiddou et al. [2013]; [12]	USA 2006–2012	935	1.17 [1.00–1.36]	0.99 [0.85–1.16]	Sunday	Saturday
S4	Culic [2013]; [13]	Croatia 1990–1996	2412	1.15 [1.04–1.26]	1.19 [1.07–1.32]	Monday	Thursday
S5	Sipila et al. [2016]; [14]	Finland 2009–2011	14,459	1.01 [0.96–1.07]	0.99 [0.94–1.04]	Thursday	Wednesday
S6	Kirchberger et al. [2015]; [15]	Germany 1985–2010	25,499	1.077 [0.981–1.182][a]	1.025 [0.928–1.133][a]	Monday	Friday
S7	Mofidi et al. [2019]; [16]	Iran 2012	11,051	$p = 0.869$	$p = 0.861$	Saturday	Friday
S8	Rodrigguez-Cortes et al. [2022]; [17]	Spain 2009–2019	71,992	0.99 [0.94–1.04]	1.06 [1.00–1.11]	Wednesday	Monday

NR not reported
[a]odds ratio

transitional weeks similar to those of the control periods.

Six studies (S1, S3, S4, S6, S7, S8) reported IRR data for the individual weekdays of the post-transitional week. Amongst them, S5 had partial numerical information on the AMI IR, and S8, the most recent study, calculated the ratio of the number of observed to expected events (O/E) for every day of the week. For the spring shift, four studies reported the highest IRR on the first 3 days of the post-transitional week: Sunday (S3), Monday (S4, S6), and Tuesday (S1); S8 reported the highest O/E ratio on the fourth day, and two other studies reported the highest IRR on the fifth (S5) and last day (S7).

For the autumn shift, five studies reported the highest daily IRRs on the last three days of the post-transitional week: Thursday (S4), Friday (S1, S6, S7), and Saturday (S3); S5 reported the highest IRR on Wednesday. In S8 the highest O/E ratio was on the second day after the transition.

Studies are subject to relevant methodological differences

Control periods and observed periods differed between studies. All studies analyzed the AMI incidence rates of the 7 individual days, or of the first week after DST transitions (also called the post-transitional week), with the exception of S8, which observed the AMI incidence during the 2 weeks following the transition. Meanwhile, the control periods varied significantly: four studies (S1, S2, S3, S7) used the corresponding weekdays 2 weeks before and 2 weeks after the post-transitional week as a control period. One study (S4) used two different control periods: i) all (51) non-transitional weeks and ii) 2 weeks before and 2 weeks after. Kirchberger et al. (S6) examined the months around the transition: March and April for the spring transition and September to November for the autumn transition. In one study (S5), the 2 weeks before the post-transitional week and the 2 weeks after the post-transitional week served as a control period. The most recent study by Rodriguez-Cortez et al. (S8) used the 2 weeks before the transition as a control period.

Furthermore, two studies used advanced statistical modeling to infer the post-transitional AMI IRR values. Kirchberger et al. (S6) applied a time series model and an excess model, and controlled for confounding factors such as temperature and humidity. S8 employed natural visibility graphs to observe dynamic patterns exhibited by the variables.

Observations in subgroup analyses for spring and autumn transitions

With the exception of one study (S7), all studies reported statistically significant findings in different subgroups, which are discussed as observed in the spring and autumn shift. The following subsection focuses on age, sex, and cardiac medications, which were relevant modifiers in all studies. All other relevant modifying variables are listed in **Table 2**.

For the spring shift, Janszky et al. (S1) reported a more pronounced elevation in AMI in patients with low cholesterol and triglycerides and among those taking aspirin or calcium-channel blockers. In contrast, Kirchberger et al. (S6) found beta-blockers and calcium-channel blockers to be associated with lower risk in the spring transition, whereas patients with ACE inhibitors had an increased risk. In Jiddou et al. (S3), more significant use of calcium channel blockers was found on the Sunday after the transition in the study group compared with that in the control group. Results from Janszky et al. (S2) suggested that the effect of the spring transition on AMI rate was generally larger in women and in the population aged under 65 years. However, Culic (S4) reported that patients whose AMI occurred during the observa-

Table 2 Subgroup analyses for risk-modifying factors in comparing the study group (acute myocardial infarction [AMI] patients following the daylight saving time [*DST*] transition) to the control group (AMI patients during the control period). For details of the reported studies, see Table 1

Study	Autumn	Spring
S1	*Higher risk:* Male, age < 65 years	*Higher risk:* Female, age > 65 years
S2	*Lower risk:* Hyperlipidemia and statin use Calcium channel blocker use *Higher risk:* Never smoked	*Higher risk:* Low cholesterol/triglyceride levels Aspirin and calcium channel blocker use
S3	No differences in subgroup analyses	No differences in subgroup analyses
S4	*Higher risk:* Female Diabetes Hypertension Previous AMI Employment Non-engagement in physical activity *Lower risk:* Positive family history Beta-blocker, aspirin, or calcium channel blocker use before AMI	*Higher risk:* Male *Lower risk:* Being employed Current anterior AMI AMI associated with emotional stress Beta-blocker, aspirin, or calcium channel antagonist use
S5	No differences except: *Higher risk:* Diabetes	No differences except: *Lower risk:* Diabetes or ventricular arrhythmias *Higher risk:* Renal failure
S6	*Higher risk:* Previous MI	*Higher risk:* Male, ACE inhibitor use *Lower risk:* Beta-blocker and calcium channel blocker use

AMI acute myocardial infarction, *MI* myocardial infarction, *ACE* angiotensin-converting enzyme

tion period were significantly more likely to be male. In addition, nonsignificant trends toward a lower likelihood of beta-blocker, aspirin, or calcium antagonist use were also present. While Jiddou et al. (S3) reported a significantly greater incidence of non-ST-elevation myocardial infarction (NSTEMI) after the transition to DST in the spring study group compared with the control group, proportions of ST-elevation myocardial infarction (STEMI) patients were similar between the study week and control weeks in Sipila et al. (S5) and Rodrigues et al. (S8).

For the autumn shift, Janszky et al. (S1) reported that patients with hyperlipidemia and those taking calcium channel blockers had a lower than expected risk following the transition. The incidence of AMI was also lower among patients taking calcium channel blockers in Culic (S4). While Janszky et al. (S2) suggest that the autumn effect was more pronounced in men than in women, the female sex was significantly predictive of AMI in Culic (S4). Culic (S4) reports several risk-lowering trends in patients with AMI during the transition week such as use of beta-blocker, aspirin, or calcium antagonist. In contrast to the spring transition, no significant difference was found in the autumn incidence of NSTEMI versus STEMI by Jiddou et al. (S3). S8, however, reported an increased risk of NSTEMI compared with STEMI in the autumn shift.

Discussion

After transitions from and to DST, it is generally perceived that 1 h of sleep is "lost" in the spring shift, whereas 1 h of sleep is "gained" in the autumn shift. Both lead to an artificial shift of the body (circadian) clock relative to the official clock [18]. The disturbance of the circadian rhythm resulting from such shifts leads to disruption of physiological processes [19] and increases sympathetic activity and inflammation, which is the probable mechanism leading to the increased AMI incidence. Several studies have shown an increase in the incidence rates of medical problems, as well as of road traffic and work accidents, and a decline in cognitive performance following transitions to or from DST [1, 2, 6, 20].

The available evidence on the association between DST and AMI incidence suggests higher AMI incidence rates following the transition into DST in spring, irrespective of the choice of the control periods. The reported findings up to 2019 were summarized in a review by Manfredini et al. [21]. Our investigation differs in the selection of analyzed studies and in the focus of our analysis. We included two more recent studies (S7–8) and excluded a study that was based on procedural data (PCI). Moreover, our work aims at a comparative assessment of the methodological approaches and of the associated individual outcomes, while the 2019 review places greater emphasis on the overall observed effect sizes.

An increase in AMI incidence rate was visible in six out of the eight identified studies, of which four reported a statistically significant difference. Of note, the increase in AMI incidence rate in the week following the transition into DST is highest when compared to the AMI incidence rates of all non-transitional weeks. Interestingly, the autumn DST transition is associated with a significantly higher AMI incidence when all non-transitional weeks were chosen as the control period [13]. As circadian misalignment occurs in both DSTs, one may expect similar results. One possible explanation for this phenomenon is the direction of the clock change, namely forward in the spring shift. In contrast to the autumn shift, 1 h of sleep is "lost" in the spring shift, which could accentuate the adaptation stress to the time shift, and ultimately increase the risk of AMI.

The available data about AMI IR for the post-transitional weekdays suggest an increase in AMI on the first weekdays after the spring and a decrease after the autumn transition. In comparison to the studies' methods, the choice of observed and control periods are very heterogeneous. According to Culic et al., these periods were chosen "following the arbitrarily determined periods that have been used

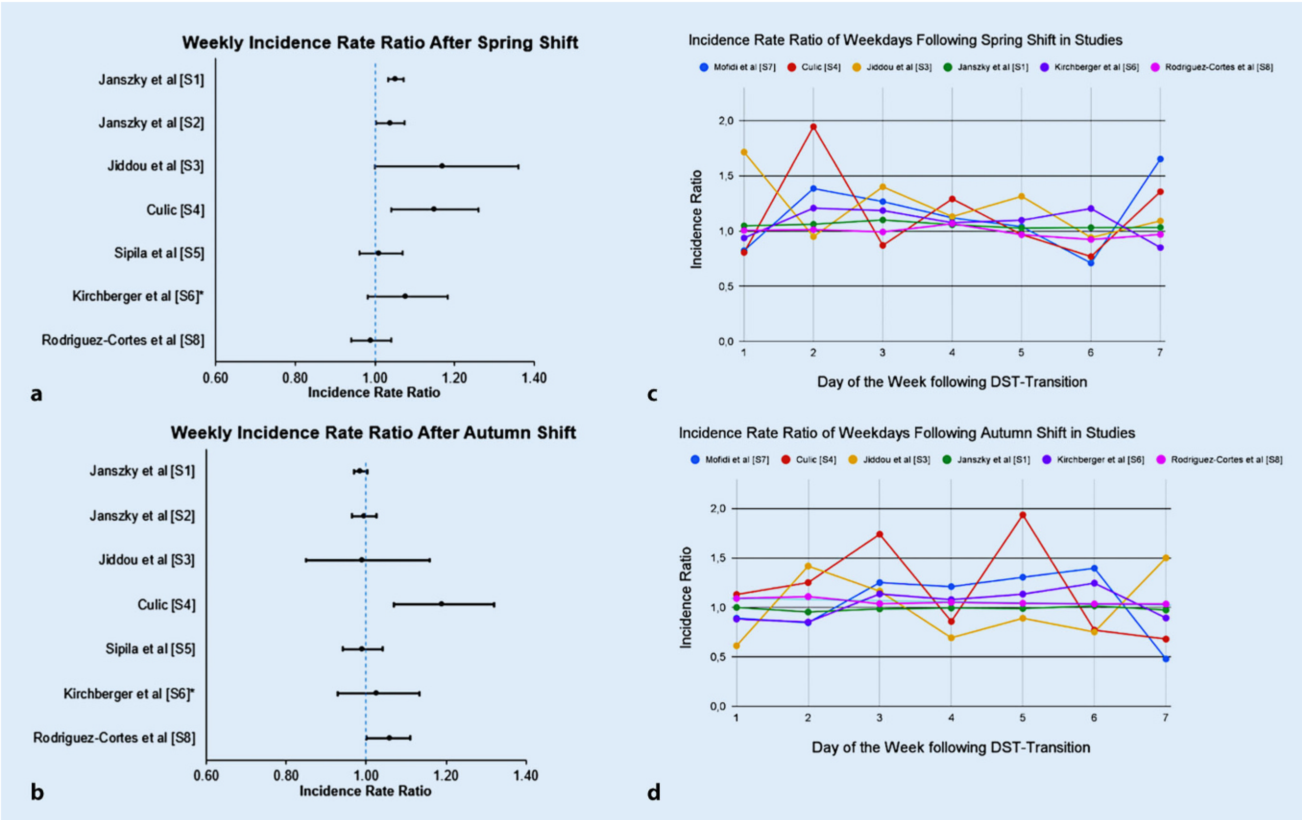

Fig. 2 ▲ Acute myocardial infarction (AMI) incidence rate (IR) of the post-transitional week and of the post-transitional weekdays. **a** and **b** Results of the reported incidence rate ratios of the whole week(s) after DST transitions for the spring shift (**a, c**) and for the autumn shift (**b, d**). *Asterisk* S6 reported the odds ratio. **c** and **d**: Data of the reported incidence rate ratios of the individual weekdays after DST transitions for the spring shift (**a, c**) and for the autumn shift (**b, d**)

in the first landmark study of this field" [19] and not by using empirical analysis. The variation in control periods reduces the comparability of results and can lead to false implications. For example, adjustment to circadian misalignment after DST transitions can vary individually and may take up to several weeks, partly depending on factors such as the individual chronotype. Such long-term adjustment effects would be excluded in a control period of 1 or 2 post-transitional weeks, which may lead to the incorporation of still-adjusting and at-risk individuals into the control group, ultimately resulting in an underestimation of the effect of DST on the AMI IR. Only one study used a control period beyond the first weeks following DST transitions (S4). The IR was measured based on the incidence rates of AMI in all non-transitional weeks of the year and reported significantly higher rates of AMI in the post-transitional week, both in autumn and spring [13].

An increasing number of countries are abolishing DST or similar practices. The assumed economic benefits of DST are uncertain and a topic of ongoing debate. A study that examined the difference in energy consumption in Turkey after the country abolished its DST policy in 2016 concluded that the "Daylight Saving Time policy does not lead to a measurable amount of electrical energy savings" [22]. More countries are abolishing time shifts by adopting a permanent time. In 2022, three countries switched to permanent DST: Syria, Jordan, and Iran. In 2018, the European Parliament voted to end the practice of DST by adopting a respective resolution [23]. In March 2022, the USA followed by passing a bill allowing permanent DST in all US states [24]. Neither continent had yet implemented these changes at the time of writing. Despite the soon-to-be-expected obsolescence of DST shifts, DST generates opportunities for investigation of the effects of circadian shifts on human health, as they affect the whole population of a nation or continent.

Several environmental and societal factors are known to influence AMI IR. Amongst them, outside climate and especially temperature were shown to have a directly measurable impact [25, 26]. Of the eight studies included herein, only Kirchberger et al. (S6) corrected for outside temperature in their model. Other known factors that may influence the AMI IR are vacation and national holidays or sports events [27–29]. Considering the rather large statistical influence of temperature on AMI rate, which can increase the IR by up to twofold, the correction for environmental factors, especially temperature, seems imperative to quantify the real effect of DST on the AMI IR.

A recent analysis of daily all-cause mortality rates in 16 European countries over the period of 1998–2012 showed a decrease in mortality rates in spring (−3.6% week 1; −2.9% week 2 post-DST), while an increase was reported in autumn (+1.8% week 1; +2.3% week 2 post-DST), both during the 2 weeks subsequent to the DST transition [30]. The findings imply that DST may impact the overall mortality risk, yet it remains unclear why the increase is seen after the spring transition rather than the autumn transition. Furthermore, a temporal alignment analysis around the DST transition dates showed a consistent septadian mortality pattern throughout the year, with a significant drop on Sundays and subsequent increase on Mondays, regardless of seasonal variations. This pattern, which is potentially attributable to the weekend–working week rhythm, is likely to influence the results of the daily comparison of AMI IR after DST shifts.

Based on the available data, AMI incidence rates may increase after both the spring and autumn DST shifts. However, results are not uniform and have not been robustly reproducible (see ◘ **Fig. 2**). Future studies should control for potential confounding variables, such as environmental influences, and should report the results of different control periods if used in the analysis.

Limitations

This work has several limitations. The number of studies that specifically investigate the relationship between DST and the incidence of AMI is limited. Furthermore, the included studies differed widely in terms of sample size and the investigated timeframe and used different statistical methods and control periods, which makes them difficult to compare. We therefore emphasize these inherent differences as a potential source of the divergent results. The identified studies did not use a universal definition of AMI, and thus potentially reported different types of events. Lastly, most of the studies did not control for most of the known potential confounders that may influence AMI incidences, such as climate/weather, societal events, or general economic and social trends. Another limitation of this review is publication bias: studies that report statistically significant results are more likely to be published. Lastly, all studies were based on incidence rates in specific countries and populations, and may therefore not be representative of the general population, potentially further limiting the applicability to a universally generalizable finding.

Conclusion

The available evidence suggests a potential link between daylight saving time (DST) transitions and the incidence of acute myocardial infarction (AMI). The majority of studies found an increase in the AMI incidence rate following the transition into DST in the spring and a similar yet less pronounced effect for the autumn time shift. However, findings are inconsistent and have not been universally reproducible. Methodological differences make it harder to compare effects, highlighting the need for standardized approaches in future research. Controlling for potential confounding factors, such as environmental influences and societal events, seems crucial to better understand the true impact of DST on AMI incidence. Despite the 2019 EU decision to discontinue DST in the EU, it is still in place today, calling for further research and education on the negative health impacts of DST transitions.

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Declarations

Conflict of interest. A. Fansa, I. Fietze, T. Penzel, and S. Herberger declare that they have no competing interests.

For this article no studies with human participants or animals were performed by any of the authors. All studies mentioned were in accordance with the ethical standards indicated in each case.

References

1. Prats-Uribe A, Tobias A, Prieto-Alhambra D (2018) Excess risk of fatal road traffic accidents on the day of daylight saving time change. Epidemiology 29(5):e44–e45
2. Orsini F et al (2022) Driving simulator performance worsens after the spring transition to daylight saving time. iScience 25(7):104666
3. Carey RN, Sarma KM (2017) Impact of daylight saving time on road traffic collision risk: a systematic review. BMJ Open 7(6):e14319
4. Barnes CM, Wagner DT (2009) Changing to daylight saving time cuts into sleep and increases workplace injuries. J Appl Psychol 94(5):1305–1317
5. Roenneberg T et al (2019) Why should we abolish daylight saving time? J Biol Rhythms 34(3):227–230
6. Gaski JF, Sagarin J (2011) Detrimental effects of daylight-saving time on SAT scores. J Neurosci Psychol Econ 4:44–53
7. Fishbein AB, Knutson KL, Zee PC (2021) Circadian disruption and human health. J Clin Invest (131 (19))
8. Chudow JJ et al (2020) Changes in atrial fibrillation admissions following daylight saving time transitions. Sleep Med 69:155–158
9. Sipila JO et al (2016) Changes in ischemic stroke occurrence following daylight saving time transitions. Sleep Med 27–28:20–24
10. Janszky I, Ljung R (2008) Shifts to and from daylight saving time and incidence of myocardial infarction. N Engl J Med 359(18):1966–1968
11. Janszky I et al (2012) Daylight saving time shifts and incidence of acute myocardial infarction—Swedish register of information and knowledge about Swedish heart intensive care admissions (RIKS-HIA). Sleep Med 13(3):237–242
12. Jiddou MR et al (2013) Incidence of myocardial infarction with shifts to and from daylight savings time. Am J Cardiol 111(5):631–635
13. Culic V (2013) Daylight saving time transitions and acute myocardial infarction. Chronobiol Int 30(5):662–668
14. Sipila JO, Rautava P, Kyto V (2016) Association of daylight saving time transitions with incidence and in-hospital mortality of myocardial infarction in Finland. Ann Med 48(1–2):10–16
15. Kirchberger I et al (2015) Are daylight saving time transitions associated with changes in myocardial infarction incidence? Results from the German MONICA/KORA myocardial infarction registry. BMC Public Health 15:778
16. Mofidi M et al (2019) Daylight saving time and incidence ratio of acute myocardial infarction among Iranian people. J Med Life 12(2):123–127
17. Rodriguez-Cortes FJ et al (2022) Daylight saving time transitions and cardiovascular disease in Andalusia: time series modeling and analysis using visibility graphs. Angiology (p. 33197221124779)
18. Kantermann T et al (2007) The human circadian clock's seasonal adjustment is disrupted by daylight saving time. Curr Biol 17(22):1996–2000

19. Culic V, Kantermann T (2021) Acute myocardial infarction and daylight saving time transitions: is there a risk? Clocks Sleep 3(4):547–557
20. Zhang H et al (2020) Measurable health effects associated with the daylight saving time shift. PLoS Comput Biol 16(6):e1007927
21. Manfredini R et al (2019) Daylight saving time and acute myocardial infarction: a meta-analysis. J Clin Med (8 (3))
22. Küfeoğlu S et al (2021) Daylight saving time policy and energy consumption. Energy Reports 7:5013–5025
23. (2019) Parliament backs proposal to end switch between summer and winter time in 2021 | News | European parliament. https://www.europarl.europa.eu/news/en/press-room/20190321IPR32107/parliament-backs-proposal-to-end-switch-between-summer-and-winter-time-in-2021. Accessed 15 June 2022
24. Shepardson D (2022) U.S. Senate approves bill to make daylight saving time permanent. https://www.reuters.com/world/us/us-senate-approves-bill-that-would-make-daylight-savings-time-permanent-2023-2022-03-15/. Accessed 15 June 2022
25. Danet S et al (1999) Unhealthy effects of atmospheric temperature and pressure on the occurrence of myocardial infarction and coronary deaths. A 10-year survey: the Lille-world health organization MONICA project (monitoring trends and determinants in cardiovascular disease). Circulation 100(1):E1–E7
26. Madrigano J et al (2013) Temperature, myocardial infarction, and mortality: effect modification by individual- and area-level characteristics. Epidemiology 24(3):439–446
27. Wilbert-Lampen U et al (2008) Cardiovascular events during world cup soccer. N Engl J Med 358(5):475–483
28. Keller K et al (2021) Total numbers and in-hospital mortality of patients with myocardial infarction in Germany during the FIFA soccer world cup 2014. Sci Rep 11(1):11330
29. Mohammad MA et al (2018) Christmas, national holidays, sport events, and time factors as triggers of acute myocardial infarction: SWEDEHEART observational study 1998–2013. BMJ363:k4811
30. Levy L et al (2022) Daylight saving time affects European mortality patterns. Nat Commun 13(1):6906

Zusammenfassung

Führt die Zeitumstellung zu mehr Herzinfarkten?

Hintergrund: Der Wechsel zwischen Winter- und Sommerzeit wird in über 70 Ländern praktiziert. Der wirtschaftliche Nutzen ist umstritten und hat zusammen mit den vermuteten negativen gesundheitlichen Effekten zur Entscheidung geführt, die Zeitumstellung in der EU und den USA abzuschaffen. Die Zeitumstellung stört den zirkadianen Rhythmus und führt zu messbaren negativen Effekten. Hierzu zählt auch die Inzidenz akuter Myokardinfarkte (AMI), die im Verdacht steht, als Folge der Zeitumstellung zuzunehmen.
Ziel der Arbeit: Ziel des vorliegenden Übersichtsartikels war es, den Zusammenhang zwischen Zeitumstellung und der Inzidenz von AMI anhand der aktuell verfügbaren Evidenz zu untersuchen.
Material und Methoden: Es erfolgte eine systematische Literatursuche der MEDLINE-Datenbank nach Studien, in denen die Inzidenz der AMI nach der Zeitumstellung im Frühjahr und im Herbst analysiert und mit einer Kontrollperiode verglichen wurde. Von 26 identifizierten Studien erfüllten 8 die Einschlusskriterien. Die Studien und ihre Ergebnisse wurden mit Fokus auf methodische Unterschiede, gemeldete Inzidenzraten und Subgruppenanalysen interpretiert.
Ergebnisse: In insgesamt 7 Studien wurde das Verhältnis der Inzidenzraten (IRR), bzw. von beobachteter zu erwartender Inzidenz, sowie das Wahrscheinlichkeitsverhältnis angegeben, während in einer Studie nur IRR-Werte für die einzelnen Tage und statistische Signifikanzniveaus für die Übergangswochen publiziert wurden. Nach der Zeitumstellung im Frühjahr fand sich in 6 Studien ein Anstieg der AMI-Inzidenz, dabei wurde in 4 davon über statistisch signifikante Ergebnisse berichtetet. Nach der Zeitumstellung im Herbst wurde in 3 Studien ein Anstieg festgestellt, wovon 2 statistisch signifikant waren.
Schlussfolgerung: Von einer Erhöhung der AMI-Inzidenz wird nach den Zeitumstellungen im Frühjahr und im Herbst berichtet. Für ein besseres Verständnis werden zukünftige Studien benötigt, die externe Einflussvariablen korrigieren.

Schlüsselwörter
Jahreszeiten · Sympathisches Nervensystem · Zirkadianer Rhythmus · Inzidenz · Kardiologie