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ВПЛИВ ЧИННИКІВ ДОВКІЛЛЯ НА РИЗИК РОЗВИТКУ ЦЕРЕБРОВАСКУЛЯРНОЇ ПАТОЛОГІЇ

Мета дослідження — оцінка впливу чинників довкілля на ризик розвитку цереброваскулярної патології (в умовах Одеської області). Показано, що основними чинниками ризику розвитку гострого порушення мозкового кровообігу є нерухомий спосіб життя (69,8 %), гіпертрофний аліментарний статус (72,8 %), куріння (44,4 %) та проживання в екологічно несприятливих умовах (42,7 %). Незадовільні умови за безпекою водопостачання та забрудненням овочевої продукції нітратами реєструються у 60,5 % хворих, що проживають у сільській місцевості. Тяжкість інсульту корелює з ризиком виникнення інсульту за алгоритмом MRSC ($r=0,67$). У хворих з повторним інсультом значення MRSC значущо вище — (81 ± 3) бала, ніж у пацієнтів з інсультом, що стався вперше у житті — (73 ± 3) бала.

Ключові слова: цереброваскулярна патологія, гостре порушення мозкового кровообігу, довкілля, оцінка ризику.

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INFLUENCE OF ENVIRONMENTAL FACTORS ON THE RISK OF CEREBROVASCULAR DISEASE

The purpose of the study was to assess the impact of environmental factors on the risk of cerebrovascular disease (in the Odessa region). It was shown that the main factors of the risk of developing acute cerebrovascular accident are the fixed life style (69.8%), hypertrophic alimentary status (72.8%), smoking (44.4%) and living in environmentally unfavorable conditions (42.7%). Unsatisfactory conditions for the safety of water supply and contamination of vegetable products by nitrates are registered in 60.5% of patients living in rural areas. These verity of the stroke correlates with the risk of stroke by the MRSC algorithm ($r=0.67$). In patients with a repeated stroke, the significance of MRSC is higher (81 ± 3 points) than in patients with a stroke that occurred for the first time in life (73 ± 3 points).

Key words: cerebrovascular pathology, acute cerebrovascular accident, environment, risk assessment.

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ALL-CAUSE MORTALITY AND NHS SICKNESS ABSENCE RATES IN ENGLAND SHOW A LAGGED SERIES OF STEP-LIKE CHANGES

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Introduction

While working at a hospital in Berkshire, England in 1993 it was noted that medical admissions (and only medical admissions) showed a dramatic step-like increase which commenced precisely in mid-March. Nothing in the hospital or surrounding health care system had been changed, and this unique event appeared to sweep across the whole UK [1–3].

This unique type of event appears to keep recurring, but because such behaviour is deemed impossible it has received almost no attention [3; 4].

A key feature is that whenever medical admissions show such a

step-like increase this is seemingly accompanied by an increase in all-cause mortality [3; 4]. Additional research reveals that other health associated events such as emergency department attendances, GP referral and the gender ratio at birth all show similar behaviour [5–9]. Staff sickness absence in the National Health Service (NHS) also behaves in the same way [10].

This study uses data for the whole of England to explore the issue of whether there are lags between staff sickness absence among NHS workers and all-cause mortality.

Methods

This study uses monthly staff sickness absence rates for the NHS in England (April 2009 to January 2018) obtained from NHS

Digital [11] and monthly deaths (all-cause mortality) in England over the same period obtained from the Office for National Statistics [12] to construct a rolling (or moving) 12-month average of staff sickness absence or deaths. To detect the step-like changes successive blocks of 12-month average absence/deaths are then compared, i. e. January to December 2012 is compared against January to December 2013, move forward one month and repeat the comparison. Such rolling 12-month averages have the advantage that seasonality is removed, that data over 12-months has less statistical scatter than data from a single month, and that step-like changes are revealed as a series of up/down cycles.

Results

Figure 1 presents the results of this analysis where a lagged set of step-up and step-down behaviour, called on/off switching, is clear. Recall that the peak in sickness absence seen at January 2013 is in fact for the 12-months ending January 2013 versus the 12-months ending January 2012, hence a step-like increase in sickness absence commenced in February of 2012 and then endured for a full 12-months, etc.

Discussion

While on/off switching in sickness absence and deaths may be a new phenomenon, the concept of on/off switching is implicit in the use of Autoregressive Integrated Moving Average (ARIMA) models in forecasting [13]. Additional spatiotemporal factors can be added to these models [14]. Spatiotemporal aspects of sickness absence are considered in an accompanying article in this edition.

As can be seen in Fig. 1 both onset and cessation of each step-change is slightly over two years apart, i. e. is not a seasonal phenomenon, and that all-cause mortality appears to lag sickness absence by around eight months.

Based upon other research a time-cascade of human health emanates out of each event. Hence first to occur at roughly the same time is an increase in staff sickness absence and a switch to a higher gender ratio at birth — subject to the nine-month gestational period [8]. Then follows an increase in medical admissions and around two-months later follows the increase in all-cause mortality [2; 5; 6; 15]. An increase in GP referral appears to occur within this continuum depending on the speciality of care [16].

This unique behaviour commences at very small area level, i. e. at spatial units about the size of a social network and shows evidence of spatiotemporal spread

the type of which would accompany an infectious outbreak [15]. This local area spread creates the composite picture observed at national level as in Fig. 1. Year-of-birth cohort effects also seem to be involved [17].

Based on the range of diagnoses affecting both deaths and medical admissions mini-outbreaks (including reinfection) of the persistent immune modifying herpes virus cytomegalovirus (CMV) have been proposed as a potential cause [1; 7; 8; 18]. CMV as the cause awaits confirmation. The one-year duration of each event may be linked to the fact that there is a distinct transition in health status which occurs in the last year of life [19–21].

Researchers in occupational health, sickness absence and medical conditions are advised to use running 12-month analysis to reveal these hidden patterns, and to check that these events are not

Rolling 12-month
difference, %

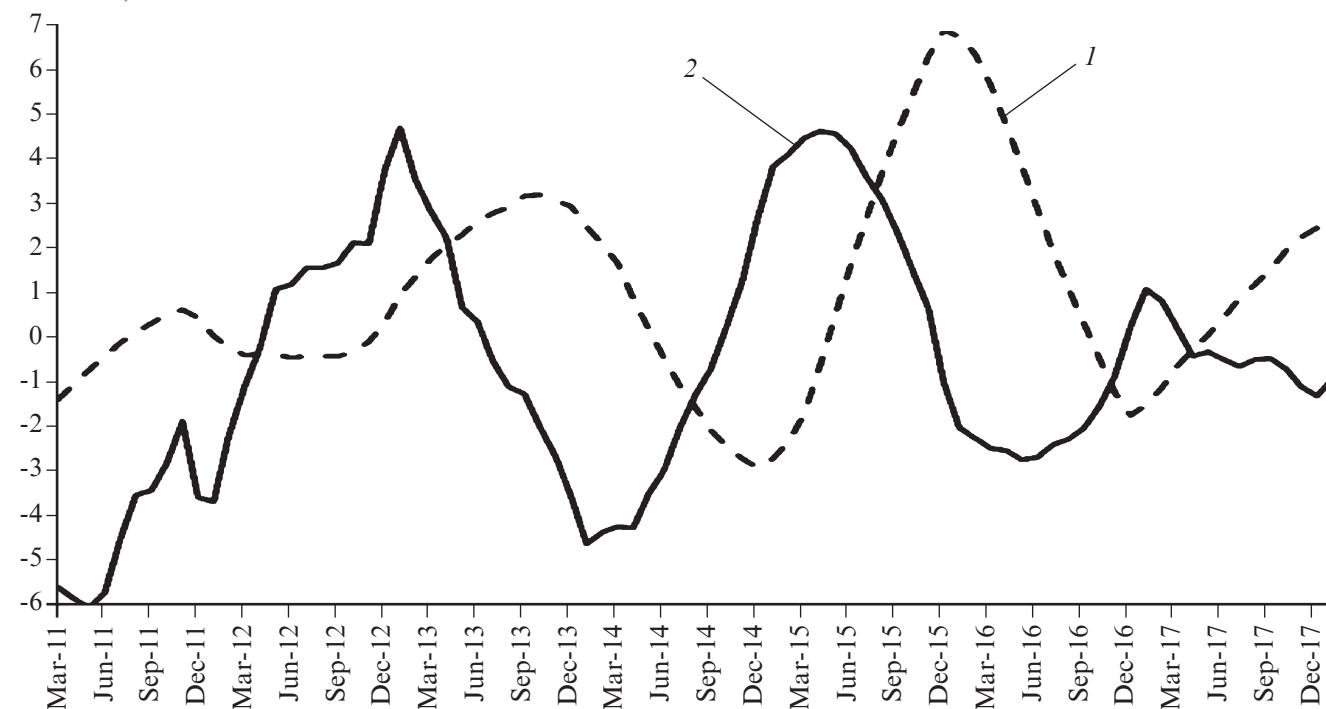


Fig. 1. Rolling 12-month average differences in all-cause mortality (1) and NHS staff sickness absence (2) in England

acting as a confounder in existing research which is usually based on calendar year totals.

Ключові слова: відсутність хвороби, смертність від будь-яких причин, національна служба охорони здоров'я, Англія, відсталі цикли, покрокові зміни.

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Родні П. Джонс

ПОКАЗНИКИ СМЕРТНОСТІ ВІД БУДЬ-ЯКИХ ПРИЧИН ТА ВІДСУТНОСТІ ХВОРОБИ NHS В АНГЛІЇ ДЕМОНСТРУЮТЬ ВІДСТАВАННЯ ПОКРОКОВИХ ЗМІН

Покрокові зміни як здоров'я медичних працівників, так і загальної смертності від будь-яких причин у більш широкій популяції Англії відстають приблизно на 8 місяців. Як відомо, багато інших аспектів медичної допомоги показують однакові покрокові зміни.

Ключові слова: відсутність хвороби, смертність від будь-яких причин, національна служба охорони здоров'я, Англія, відсталі цикли, покрокові зміни.

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ALL-CAUSE MORTALITY AND NHS SICKNESS ABSENCE RATES IN ENGLAND SHOW A LAGGED SERIES OF STEP-LIKE CHANGES

Step-like changes in both healthcare worker sickness absence and all-cause mortality in the wider population of England are shown to lag by around 8 months. Many other aspects of medical care are known to show the same step-like changes.

Key words: sickness absence, all-cause mortality, national health service, England, lagged cycles, step-change.