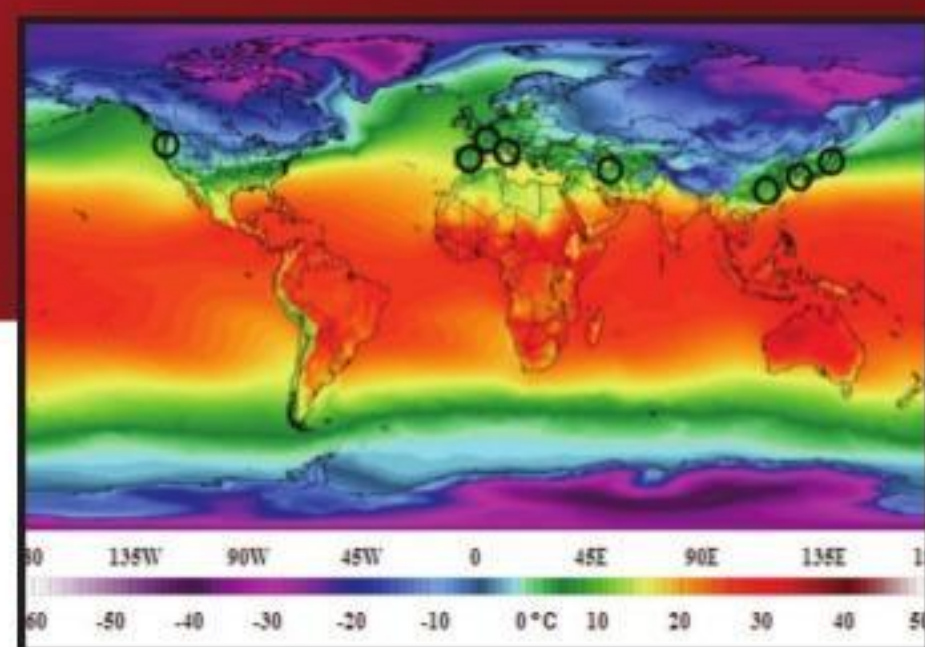
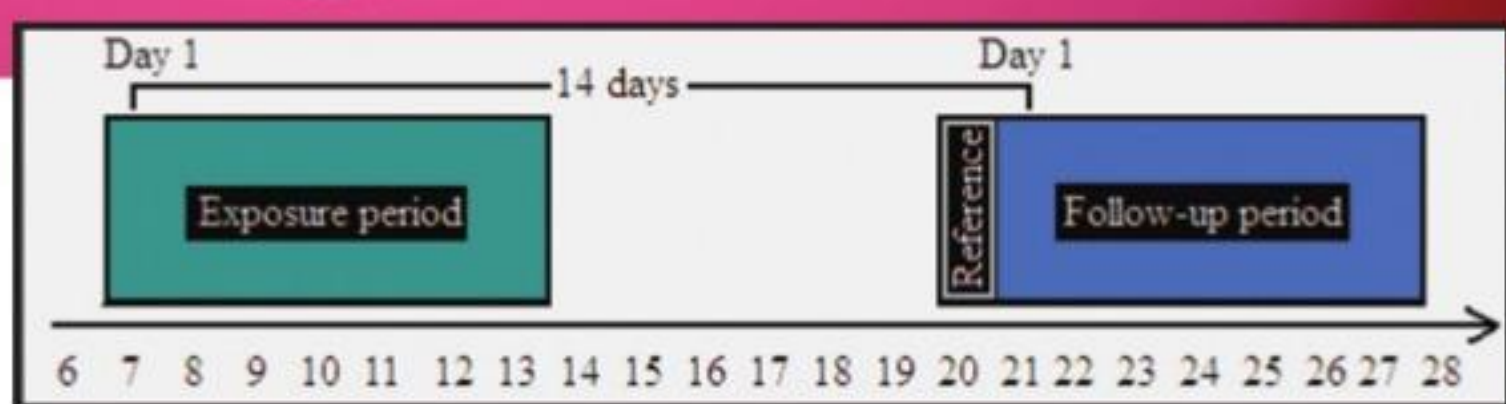




COVID & warm weather

A rigorous study shows that latitude or climate have no effect on Covid-19



5 ANANT HANARAYAN

There has been considerable expectation that the spread of Sars-CoV2 would slow down, like its cousin, the common flu, when the weather warms.

A study by Peter Jüni, Martina Rothenbühler, Pavlos Bobos, Kevin E Thorpe, Bruno R da Costa, David N Fisman, Arthur S Slutsky and Dionne Gesink, from St Michael's Hospital, Toronto, the University of Toronto, a firm in Zürich, Western University, London, in Ontario and the University of Berne, Switzerland, published in the Canadian Medical Association Journal, concludes that this is a relief we cannot expect.

In the third week of March this year, a study funded by the US National Institutes of Health reported that analysis of incidence of Covid-19 showed that community spread of the disease was limited to a narrow zone at latitude 30-50° N. The zone was initially seen to cover South Korea, Japan, Iran, and Northern Italy, and then Northwestern US, Spain, and France. The places affected were seen to have consistently similar weather patterns, consisting of average temperatures of five-11°C, combined with low levels of humidity. The study included graphics that showed areas of high incidence, on maps with colour coding of latitudes and temperature ranges.

The study said, "The distribution of significant community outbreaks along restricted latitude, temperature,

and humidity are consistent with the behaviour of a seasonal respiratory virus. Additionally, we have proposed a simplified model that shows a zone at increased risk for Covid-19 spread. Using weather modelling, it may be possible to predict the regions that are most likely to be at higher risk of significant community spread of Covid-19 in the upcoming weeks, allowing for concentration of public health efforts on surveillance and containment."

The comparatively lesser numbers of Covid-19 positive cases in India, at the time, and in following weeks, held out a hope that the climate, among other factors, like Indians having received the BCG vaccine, the smaller proportion of over-60s in the population, would help India make a good showing. The current study, in the Canadian journal, however, says that measures of reducing mobility and social distancing may prove effective, but it is unrealistic to expect any help from the climate.

The study covered 375,609 cases, spread over 144 geopolitical areas with significant incidence, worldwide, as on 10 March 2020. China, South Korea, Iran and Italy were excluded, as the disease had progressed in these areas

and figures may not reflect accurately the trends of spread as the disease took hold. The study then compared the cumulative tally of cases as on 20 March and 27 March, arising from numbers exposed during the week, 7 to 13 March, 14 days earlier.

"It is unclear whether Covid-19 is also seasonal and climate-dependent, but many of the suggested explanations for the seasonality of influenza may also be applicable to Covid-19. Evidence for seasonality and climate dependency of Covid-19 would have implications for public health and health care resource planning," the study says. Analysis of data, like numbers of cases per million population, would not be meaningful, as these are influenced by travel activity, social behaviour, when the infection first came, et al. "Comparing the current rate of reported cases with the rate of cases reported a week earlier is likely to be more helpful," the study says. We can see that this corresponds to the "days taken for numbers to double", a popular metric used to describe the rate of spread.

The study uses latitude as a criterion because changes in the main components that distinguish sum-

mers from winters – temperature, humidity and the level of ultra violet radiation – would generally follow changes in the latitude, as the days and nights are of equal length in the month of March, in the northern hemisphere.

The collected data was hence analysed, primarily, based on the latitude, and as secondary factors, on the temperature and humidity. Further factors considered were social action that had been taken, namely, closing down of schools, restriction of mass gatherings and social distancing, during the exposure period. Rigorous methods to assess the dependence of the data on the different factors and the "p value" – a statistical indicator of the significance of the data in holding that a given hypothesis is true or false – was worked out for the different factors being considered.

The "p value" indicates the probability of the relationship that we are looking for turning out to be false – or in other words, that what statisticians call the "null hypothesis" to be true. Now, when the data of the ratio of the number of cases detected two weeks after a period of exposure, to the number of cases when starting out, was

analysed, in this mathematically-sanitised manner, the result was high p value for the effect of latitude and temperature and a moderate value for humidity, but low p value for the effect of closing schools, forbidding mass gathering and maintaining social distancing. That this contradicts the findings of the earlier study is clearly because the previous study was comparing absolute numbers, which, as the Canadian study says, "are affected by idiosyncratic processes."

That the social measures are effective has been widely recognised and these measures are the central thrust of strategy, worldwide. The Canadian study, to identify and validate the factors seen to affect the spread, is a valuable guide to states to steer clear of any expectation of relief during the warm period. The world is battling an attack that redoubles with a moment's slackening on our part and the defence has to be guided by clinical adherence to what science advises – other considerations, economic, cultural or popular, may lead to disaster.

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Behaving the 'new normal' way

The Covid-19 outbreak will likely leave a significant legacy on human well-being

JILLY GIBSON MILLER

This week UK citizens are adjusting to the easing of Covid-19 lockdown measures, announced on Sunday, when Prime Minister Boris Johnson declared a shift in the message from "Stay at home" to "Stay alert". This was much to the disappointment of behavioural scientists, who have strongly advocated the need for clearly specifying behaviours that are required from citizens to control the spread of Covid-19, since we know that people are far more likely to carry out behaviours when they understand exactly what (and why) they are being asked to do.

The uncertainty and ambiguity of these messages are taking their toll on UK citizens, who have reported heightened experiences of anxiety, depression and stress in the early weeks of the lockdown. As the lead health psychologist on the Covid-19 Psychological Research Consortium Study, I am concerned with how people regulate their behaviour to meet social distancing guidelines and the impact of these efforts on mental health.

The Covid-19 PRCS is a longitudinal, multi-country study that is assessing the psychological impact of the Covid-19 pandemic in the general population. We are a team of psychologists and academics at the Universities of Sheffield and Ulster in the UK. So far, we have surveyed a representative sample (2,025 people) of the UK population in two waves – first in March 2020 and then again in April 2020 – to assess the continuing impact of the lockdown on mental health.

As well as recording how people are feeling and behaving, our survey also measures a wide range of factors

that impact upon behaviour and mental health. For example, we are interested in people's political and religious beliefs, whether they have lost income as a result of Covid-19, how many people they live with and what (private) space they have access to. All these aspects of life tend to have an impact on the way people behave and the reasons why they behave as they do.

The findings of our survey have provided some fascinating insights into the drivers of human behaviour and the impact that the lockdown has had on mental health. The first few weeks of lockdown saw a peak in rates of anxiety and depression, which reduced over time as people adjusted to the lockdown conditions. The groups we found who were struggling most with their mental well-being were those who were younger, had children in the home, lost income because of the outbreak or had pre-existing health conditions. These groups will continue to be more vulnerable and may require special attention in terms of providing support during the lockdown to cope with the extra strain of these risk factors.

Another member of the Covid-19 PRCS team has led an investigation of behaviour and mental health in young people in the UK, aged 13-24, and uncovered insights into how our younger population are coping in the lockdown. It may come as little surprise to learn that more than half of young men aged 19-24 have breached the UK's lockdown rules and one in five men aged 19-21 have been dispersed, arrested, fined or taken home by police for breaking the rules – compared with just one in 10 young women of the same age.

Of course, the Covid-19 outbreak has had disproportionate impacts on



the health and well-being of specific groups in society all over the world that require our particular and urgent attention. Figures presented in the UK highlight daily that it is the poorest and most marginalised in our society that are faring the worst, a process labelled by Michael Marmot, professor of epidemiology and public health at University College London, as the "slow burn of inequality" exposed by epidemics.

In India, it seems that underprivileged migrant workers, rendered homeless and unable to travel to their home villages for support and health care, have become vulnerable to Covid-19. In terms of mental health, the Covid-19 PRCS provides evidence that more women than men are experiencing clinical levels of generalised anxiety during the outbreak. This may well be related to extra burdens placed upon women by childcare and house-

work during the lockdown.

It has been widely reported that there have been exponential increases in domestic violence and abuse of women across the globe, compounded by lockdowns that have rendered women isolated and powerless to escape their abuser. Indeed, UN Women consider that violence against women is operating as a "shadow pandemic" to Covid-19. I am working with two Indian colleagues from the University of Delhi and Tilburg University in the Netherlands on a research programme that will explore the impact of Covid-19 on victimisation, violence and abuse on women in India, with a specific focus on investigating the increasing cases of domestic violence. This research will also investigate the challenges faced by NGOs, women's organisations and community feminist interventionists in dealing with cases of domestic violence during

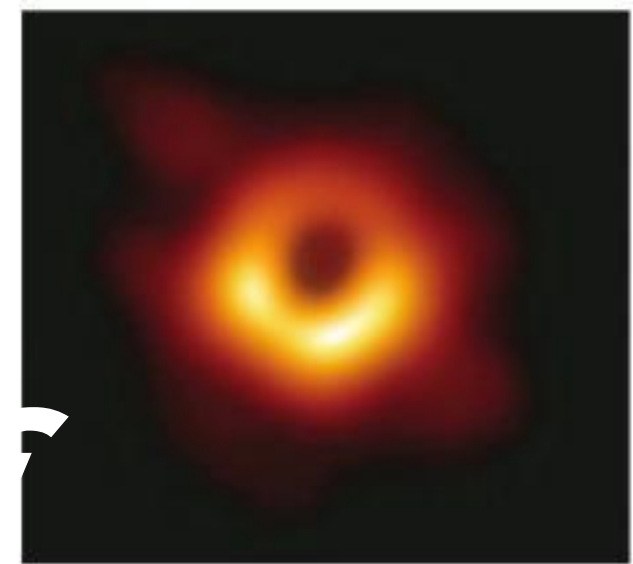
Covid-19. We aim to generate a gender sensitive country-wide response strategy for addressing the increase in the violence against women.

There are far-reaching impacts on vulnerable groups around the world and it is important that research focuses on mitigating the inevitable consequences in the months and years following this global crisis. The Covid-19 PRCS will continue to explore these and many more issues over the next 12 or so months, in the UK and across the world (we have partners in Ireland, Spain and Argentina) to see how citizens cope not just with the immediate difficulties of lock down, but with the transition into a "new normal". It is likely that this outbreak will leave a significant legacy on human well-being.

The writer is in the department of psychology, University of Sheffield, UK

PLUS POINTS

Closest black hole



A newly discovered black hole is closer than any other to Earth, scientists say. It is so nearby that the stars that swirl around it can be seen with the naked eye, they write in a new study. And the object could be just the "tip of the iceberg" with many other similar black holes being hidden and waiting to be found, the astronomers say.

The black hole is a mere 1,000 light years from Earth, and was spotted using a telescope at the European Southern Observatory's facility in Chile. But if a person is in the southern hemisphere, they may be able to see the stars of its system on a dark, clear night, without need for a telescope. "We were totally surprised when we realised that this is the first stellar system with a black hole that can be seen with the unaided eye," said Petr Hadrava, Emeritus Scientist at the Academy of Sciences of the Czech Republic in Prague and co-author of the research.

The system was first observed as part of a study on double-star systems, with scientists watching it to better understand those solar systems that have two suns. But they were shocked to find that one particular example appeared to be hiding a black hole, which had previously not been discovered.

It is one of the first black holes to be found that does not interact violently with its environment, meaning that it is truly black, and not visible due to its impact on other visible objects like stars. Instead, astronomers spotted its presence by watching the orbit of the system's inner star -- which seemed to be disturbed by some large, mysterious object.

One of the two stars seems to orbit around the unseen object every 40 days, while the other sits at a further distance from both. That meant that astronomers had to watch the system over a longer period, allowing them to get a picture of the orbits over several months of observations.

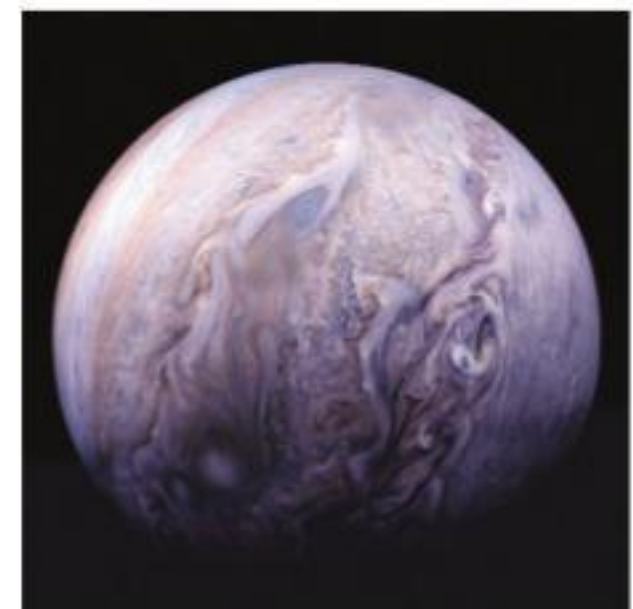
The fact that the black hole was not easily spotted means that there could be many more such systems waiting to be found. "There must be hundreds of millions of black holes out there, but we know about only very few," ESO scientist Thomas Rivinius said. "Knowing what to look for should put us in a better position to find them."

Already, astronomers have speculated that another system known as LB-1 that is also relatively close to Earth might also be such a triple system, since observations have led to "stunningly similar" data, the researchers write in the new paper. Further observations are needed to confirm that discovery.

The new paper, "A naked-eye triple system with a nonaccreting black hole in the inner binary", is published in *Astronomy & Astrophysics*.

The independent

Stormy glory



Astronomers in the US have produced ground-breaking photos of the planet Jupiter using "lucky imaging" infrared technology that eliminates the distortion that the Earth's atmosphere causes in images, the BBC reported.

Using the Gemini North Telescope in Hawaii, the Juno spacecraft and the Hubble Space Telescope, the team from the University of California, Berkeley was able to create the sharpest images yet of the planet by taking multiple, very short exposures and keeping only the "lucky" sharp images that were captured while the Earth's atmosphere was briefly stable.

The resulting mosaic of images reveals storm systems forming around deep clouds of water ice and liquid beneath the planet's massive 60km-high storm clouds, and gives researchers a closer look at what makes and sustains the planet's weather systems. These include deep water vapour clouds, large convective towers made of moist air similar to thunderhead clouds on Earth and clear areas below.

Understanding Jupiter's atmosphere and water content can give scientists clues on how the planet was formed.

The straits times/ann

