

ヴェネツィアで開催された第9回欧州老年医学会議にて▶  
9th Congress of the European Geriatric Medicine Society at Venice-Italy

■研究最前線

集団の観点から高齢者の健康を研究 • Research on elderly health from a population perspective



ICTも活用し  
健康寿命を延ばすまちづくり

地域密着で高齢者の生活習慣病やフレイルを予防・改善

Developing Communities to Extend Healthy Life Expectancy by Leveraging ICT

Community-based initiatives to prevent and improve lifestyle-related diseases and frailty in the elderly

◎社会安全学部 中間 千香子 准教授

• Faculty of Societal Safety Sciences — Associate Professor *Chikako Nakama*

2024年4月に、社会安全学部に着任した中間千香子准教授は、関西大学の中で医師の資格を持つ数少ない研究者の一人だ。内科医としてだけでなく救命救急の現場での経験も積みながら、公衆衛生の研究を続けてきた。今や公衆衛生の中心テーマは高齢化社会。中間准教授は多くの地域に飛び込んで高齢者と交流しながら生活習慣病や認知症、フレイル(加齢に伴う虚弱)を予防するための調査研究や、自治体などとタッグを組んで健康まちづくりの取り組みに奮闘している。

Chikako Nakama, Associate Professor who joined the Faculty of Societal Safety Sciences in April 2024, is one of the few researchers at Kansai University who is also a qualified doctor. She has pursued research in public health, while gaining extensive experience not only as an internist but also as a physician working in emergency settings. The main focus of public health study today is on aging societies. While actively immersing herself in various communities to communicate with elderly people, she has been conducting research studies to prevent lifestyle-related diseases, dementia, and frailty (age-related weakness), and working closely with local governments to promote initiatives for building healthier communities.



体組成計で測定  
Measurement with a body composition monitor

■縮まらない平均寿命と健康寿命の差

— 公衆衛生の研究に進むまでのことを教えてください。

研究の道に進む前に臨床の経験もしたいと考えて、大学卒業後は救急車の受け入れが年間6,000件を超える総合病院などで内科医として勤務し、ER(救急外来)の現場も経験しました。ERは医学的な経験を積めるだけでなく、社会的な問題も目の当たりにできる貴重な現場でした。その後、大学院に進み、特定の集団の継続的追跡調査(縦断研究)や集団の比較調査(横断研究)をするコホート研究などで、社会の人々の健康を集団の観点からとらえる「公衆衛生」という学問の面白さを実感しました。

— 現在の公衆衛生の大きなテーマは何ですか？

社会の高齢化に伴う生活習慣病などです。医学の進歩で平均寿命は延びているのですが、心身ともに支障なく日常生活を送ることができる健康寿命との差はほとんど縮まっていません。寝たきりになっても寿命を延ばせる医学の進歩も背景にあります。また、予防医学が発展しても貧困の問題があり、必ずしも全員がその恩恵を受けられていません。健康のために運動が効果的などの知識は広まっていますが、人々の行動変容にはなかなかつながりません。この2つの寿命の差を少しでも縮めることが公衆衛生の大きな課題です。

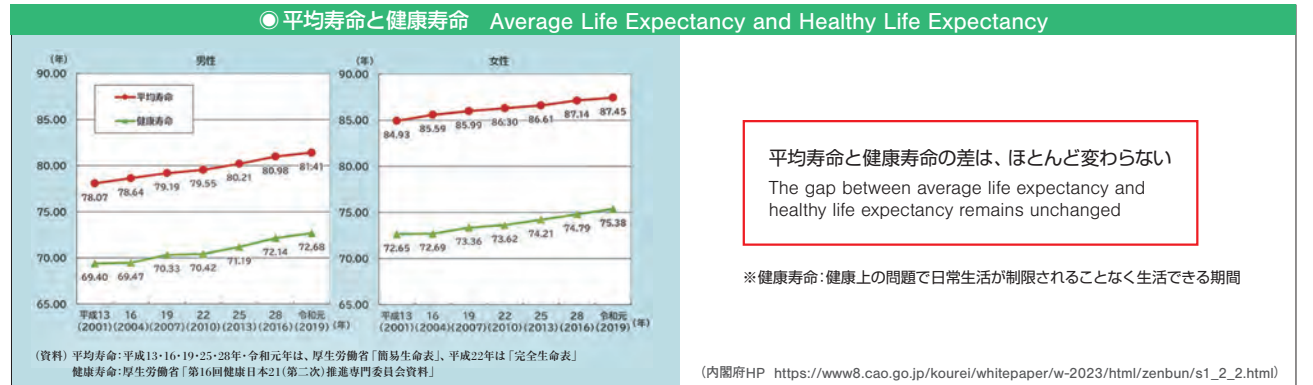
■ A Persistent Gap between Average Life Expectancy and Healthy Life Expectancy

— Please tell us about your path to public health research.

I wanted to gain clinical experience before pursuing a career in research. Therefore, after graduating from university, I worked as an internist at a general hospital that handles over 6,000 ambulance cases a year and also had hands-on experience in the emergency room (ER). The ER provided me with a valuable opportunity to witness social issues firsthand, as well as gain medical experience. Then, I went on to graduate school, where I discovered the joy of learning about public health, a field of research that investigates the health of people in society from a population perspective through cohort studies, including continuous follow-up studies (longitudinal studies) and comparative studies (cross-sectional studies) targeting specific groups.

— What do you think is the main focus of public health today?

Lifestyle-related diseases associated with the aging of society. Medical advances have contributed to increasing average life expectancy; however, an unchanging gap remains between average life expectancy and healthy life expectancy, which refers to the length of time a person can live without any physical or mental impairments. This is partly due to advances in medicine that have made it possible for people to live longer even if they are bedridden. Furthermore, despite advancements in preventive medicine, some people may not fully benefit from it because of the problem of poverty. Although people have become more aware of the effectiveness of exercise for health, it may not directly trigger a behavioral change among them. Narrowing the gap between these two types of life expectancy, even slightly, is a major challenge in public health.



■生活習慣病とフレイルが関連

— これまでの研究成果について教えてください。

コホート研究では兵庫県伊丹市と朝来市の70代と80代の計約1,000人を対象とした調査で、高齢者の生活習慣病とフレイルの関連を調べました。〈高血圧、糖尿病、脂質異常症〉と〈握力、歩行速度立ち上がり時間、転倒の既往〉との関連です。例えば血糖値が高い人の方が立ち上がり時間が遅いというデータが取れ、糖尿病があるとフレイルになりやすいことの裏付けになりました。血流の悪化や運動不足などが背景にあると推測できます。少し意外な結果としては、高血圧より低血圧の人の方に転倒が多く、握力が弱かったことです。参加者に血圧が高過ぎる人が少なかったこともあるかも知れませんが、予想外の結果でした。血圧が低いと起立性低血圧(急に立ち上がるとふらつく)などがあり転倒につながると説明できそうですが、高血圧だけでなく低血圧も要注意だということです。

■ Association between Lifestyle-Related Diseases and Frailty

— Please describe the findings from your previous research.

We conducted a cohort study to investigate the relationship between lifestyle-related diseases and frailty in the elderly. The study included a total of about 1,000 individuals in their 70s and 80s living in the cities of Itami and Asago in Hyogo Prefecture. The focus was on the relationship between “hypertension, diabetes, and hyperlipidemia” and “grip strength, walking speed, sit-to-stand time, and history of falls.” The resulting data showed, for example, that sit-to-stand time was longer in hyperglycemic individuals, supporting the observation that people with diabetes are more likely to become frail. Poor blood flow and lack of exercise may contribute to these results. Hypotensive individuals were more likely to fall and had weaker grip strength compared to hypertensive individuals, which was slightly surprising. The results were unexpected, although the small percentage of the participants with excessively high blood pressure may have partially explained them. Falls may be attributed to orthostatic hypotension caused by hypotension (dizziness when standing up suddenly), but the findings indicated that attention should be given to hypotensive individuals, as well as hypertensive ones.

■研究最前線

—コホート研究では骨格筋量と認知機能の関連研究もされていますね。

奈良県在住の65歳以上の男性1,344人を対象にした調査では、骨格筋量と認知機能を測るMMSE(ミニメンタルステート検査)というテストのスコアを比較しました。調査の結果、骨格筋量の低下と認知機能の低下に関連があることが分かりました。骨格筋量が落ちて認知機能が低下したのか、認知機能が落ちて運動しなくなり骨格筋量が低下したのか、鶏と卵の関係のようではありますが、認知機能低下の指標として筋肉量低下の度合いを使える可能性があることが分かりました。

—こうしたコホート研究の魅力と難しさは何ですか？



▲調査研究に協力してくださった方々と  
With those who cooperated in the research study

地域の人々と触れ合え、その地域差を味わえるのが魅力です。難しさは費用やマンパワー、時間がすごくかかることです。1日に50人から100人しか調査できないので1,000人規模なら10日以上かかります。都市部では人の移動が多く、長期間の追跡調査では参加者のフォローアップ率が低くなります。また、参加者集めのための名簿は自治体や町内会の協力なしには得られず、地域との信頼関係を築くことがコホート研究では重要です。

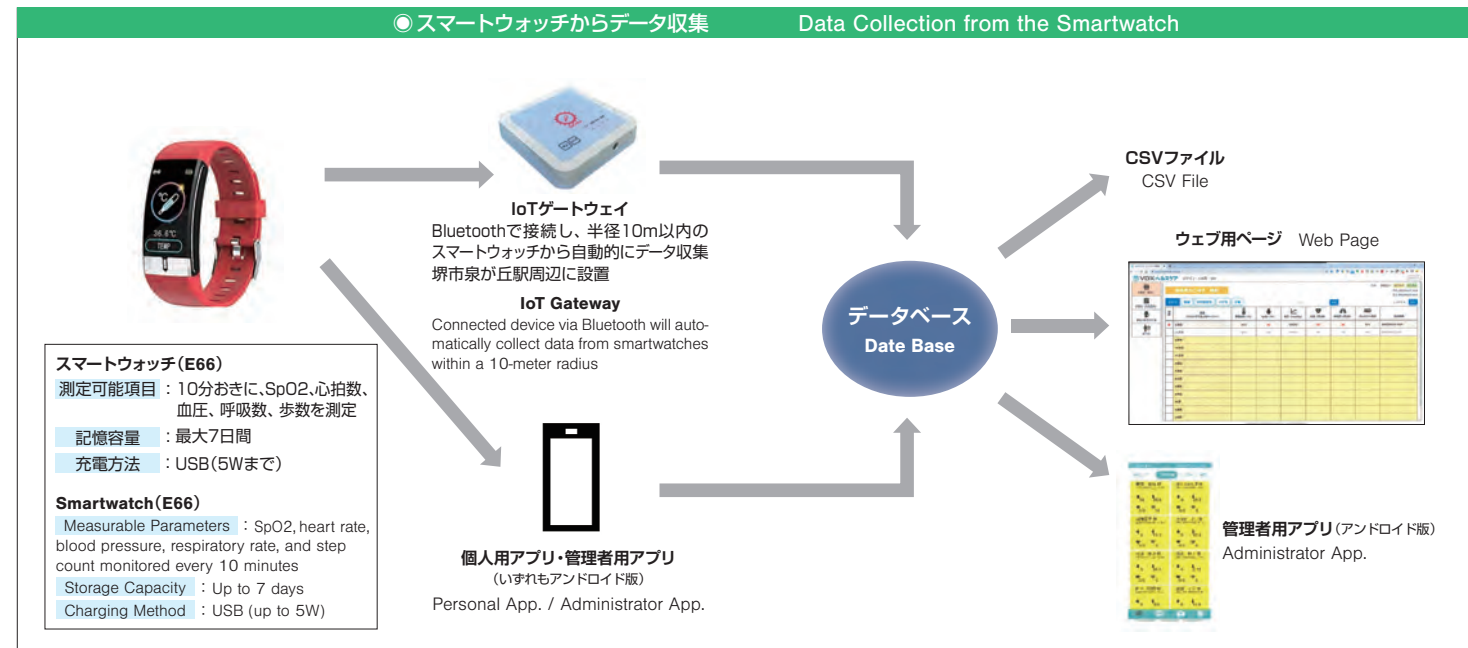
■スマートウォッチで健康状況を可視化

—最近の取り組みを教えてください。

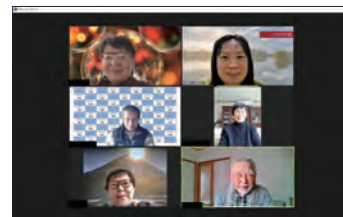
新たな研究手法としてスマートウォッチなどのウェアラブル端末を使ったデータ収集とICTを活用した健康まちづくりに取り組んでいます。高齢化の進んだ堺市の泉北ニュータウンで、孤立しがちな高齢者らがICTを活用して健康に過ごせるようにし、介護予防や健康寿命の延伸につなげる狙いです。装着したスマートウォッチで血圧、心拍数、呼吸数、SpO2(体内酸素量)、表面温度、歩数、消費カロリー、睡眠状況を測定し、月1回参加者にそれぞれの結果を健康状況などのコメントを付けてフィードバックします。データの見える化によって少しでも参加者の行動変容を促すのです。この取り組みで睡眠時無呼吸症候群の疑いが判明したり、気管支喘息の悪化を防いだりすることもできました。また、「オンライン保健室」を開室し、医師の私や看護師、整体師、栄養管理士が曜日ごとにさまざまな相談に乗りました。参加者の中で「健康診断はあそこがいい」「かかりつけ医はあの先生がいいよ」などの情報交換のコミュニティが形成されるなどの思わぬ効果も生まれました。

—高齢者にウェアラブル端末やオンラインミーティングはハードルが高いのではないのでしょうか？

大きな課題でした。スマートウォッチの不適切な使用による不具合や故障が頻発したほか、時間が経つにつれて束縛感からその装着を嫌がって外してしまう人が増え、データ収集率の低下という問題も起きました。オンラインミーティングの接続方法が分からない人も多かったです。パスワードを家族に管理してもらって



いる高齢者もいて、最初から拒否反応を持った人に行動変容させるのは至難の業です。2025年1月から始める新たな取り組みでは、その反省から下準備やデバイスの改善などを検討しています。



▲オンライン保健室の様子 Online Health Room

—その他の取り組みはありますか？

デイサービスのレベルの機能訓練でも介護度の改善効果があり、介護費や医療費の削減につながるという共同研究や、特定保健指導(メタボ健診)でのウェアラブルデバイスの有用性の研究もしています。

■地域と密着、他分野の研究者と連携

—4月に着任されて初めてゼミで学生を教える立場になりましたね。

医学部ではゼミも卒業論文もなかったので手探りですが、ゼミ生7人を相手にとても新鮮な毎日です。協調性ややる気のある学生が多く、危機管理や福祉関係などの分野で何かしら社会に貢献できる人に育ってくれるものと期待しています。

—これからの研究目標を教えてください。

健康まちづくりなど地域に密着した研究が好きなので、これからもその分野で健康寿命を延ばしていく貢献を目指しています。医学的な専門知識を生かしつつ、他の分野の研究者と連携しながら総合的な健康まちづくりを提案していきたいです。

— You also investigated the relationship between skeletal muscle mass and cognitive function in the cohort study.

We conducted a survey of 1,344 men aged ≥65 years living in Nara Prefecture, in which we compared skeletal muscle mass and the Mini-Mental State Examination (MMSE) scores, a test for assessing cognitive function. The results of the survey demonstrated a relationship between decreased skeletal muscle mass and declined cognitive function. The relationship seems to be a chicken and egg problem, as we cannot determine whether decreased skeletal muscle mass caused the decline in cognitive function, or lack of exercise due to declined cognitive function contributed to decreased skeletal muscle mass. However, the findings suggest that the degree of decrease in muscle mass may serve as an indicator of cognitive function decline.

— What do you find most appealing and challenging about cohort studies like this?

I enjoy interacting with local people and discovering regional differences. The challenge is the high cost, manpower, and time required. The number of subjects we can handle is limited to 50 to 100 per day, which means it would take more than 10 days if the sample size were 1,000 or more. In addition, the follow-up rate for urban participants tends to be lower in long-term follow-up studies due to frequent mobility (people moving away) in urban areas. Considering that we cannot obtain a list of potential participants without the cooperation of local governments and neighborhood associations, building trust with the community is essential in cohort studies.

■Leverage a Smartwatch to Visualize Health Status

— Could you tell us about your recent initiatives?

As new research tools, we have started using wearable devices, including smartwatches, to collect data, as well as applying ICT to build healthier communities. Our goal is to support elderly residents of Senboku New Town in the city of Sakai, an aging community where isolation is common, to stay healthy by utilizing ICT, which will eventually result in care prevention and extension of healthy life expectancy. They are asked to wear smartwatches to monitor blood pressure, heart rate, respiratory rate, SpO2 (amount of oxygen in the body),



skin temperature, step count, calories burned, and sleep status. The test results are shared with each participant monthly, along with comments on health status. We aim to encourage the participants to make even small changes in their behavior through data visualization. For example, this approach has helped identify suspected cases of sleep apnea syndrome and prevent the worsening of bronchial asthma. In addition, I, as a physician, along with nurses, physical therapists, and nutritionists, have provided consultation services on different days of the week through the "Online Health Room". Furthermore, the participants formed a community for information exchange, sharing details such as "recommended centers for medical checkups" and "recommended family doctors." This community was an unexpected benefit.

— Aren't wearable devices and Online meetings too difficult for the elderly?

Yes, it was a big challenge. Malfunctions and breakdowns frequently occurred due to improper use of the smartwatches. Over time, more and more participants became reluctant to wear them because of a sense of restriction, which resulted in a decline in the data collection rate. Many participants did not know how to log in to Online meetings, and some elderly individuals relied on their families to manage their passwords. As a result, it was very challenging to encourage elderly participants who were resistant from the start to change their behavior. Learning from this experience, we have been discussing how to make preliminary arrangements and improve the devices in the new initiative starting in January 2025.

— Are there any other initiatives?

Our initiatives include: 1) joint research to demonstrate that the level of care required may be reduced through simple functional training provided during day care, which helps save on nursing care and medical expenses and 2) research to assess the usefulness of wearable devices in specific health guidance (metabolic syndrome checkups).

■Close Ties with the Community and Collaboration with Researchers from Other Fields

— You started a new teaching position in April. How has it been teaching seminar students for the first time?

As I have never participated in seminars or written a graduation thesis during my time at medical school, I am still finding my way around. However, working with the seven seminar students every day has been a refreshing experience. Most of the students are cooperative and motivated. I hope they will grow to contribute to society in fields such as crisis management and welfare.

— What are your future research goals?

I would like to continue contributing to the extension of healthy life expectancy in my favorite field of community-based research, such as building healthier communities. I want to propose comprehensive health-oriented community development, leveraging my medical expertise and collaborating with researchers from other fields.