

Study identifies factors predicting physical activity in nursing students

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New research from the Mechanical and Industrial Engineering Department at the University of Massachusetts Amherst, in collaboration with the Elaine Marieb Center for Nursing and Engineering Innovation,

is helping to identify barriers to physical activity in nurses. Published in *PLOS ONE*, the [study](#) reports that the key factors influencing exercise include intrinsic motivation, certain types of social support, certain demographic identifiers and the use of health-tracking technology.

Nursing is a notoriously exhausting career, marked by irregular and long shifts and high physical demands. At the same time, prior studies show that about half of nurses fail to meet physical activity recommendations.

Joohyun Chung, associate professor in the Elaine Marieb College of Nursing and an author on the new paper, highlights how failing to meet physical activity recommendations negatively impacts nurses' overall well-being. "This is connected to [self-care](#)," she says. "When you work, it's different [physical activity] than when you go swimming or skiing." Considering that there are 4.2 million nurses in the U.S. and this field has high rates of burnout, improving nurses' well-being is an important priority.

"And, indirectly, we want to improve the health care that they deliver to their patients," says Muge Capan, assistant professor of industrial engineering at UMass Amherst and lead study author. "Health trickles down through the nurses to patient. If the [nurse](#)'s health is compromised, we know it impacts burnout, it impacts retention, it impacts diagnostic errors. If they are not at their healthiest, highest potential, then it impacts the care they give to their patients."

It is very challenging for nurses to begin new healthy habits after they enter the workforce. So the researchers saw an opportunity to preserve or encourage new healthy physical activity habits in nursing students. "What we're hoping is that they can take care of themselves first before they take care of others," says Chung.

"This population is the future," Capan adds. "If we understand the

barriers to physical activity now in this population and target them with specific tailored solutions, then in the future, we can predict who is going to be at higher risk of continuing these [sedentary] behaviors. Maybe by preventing [inactivity], we are making an impact as they transition into the actual workforce."

With this in mind, the research used validated questionnaires to identify the subsets of nursing students at greatest risk for physical inactivity and define the barriers they're experiencing.

On an individual level, high [intrinsic motivation](#) to exercise corresponds to low barriers to physical activity.

Next, the researchers found a strong influence of social support on physical activity—and that not all [social impacts](#) are helpful. High emotional support (advice, encouragement) predicted a low [barrier](#) score, but high validation support (social comparison, competition, status) predicted a high barrier score.

"I am a member of a fitness app, for example, and you can give high-fives to each other or give encouragement," says Capan. "That would be an example of emotional support, whereas validation support would be a leaderboard because you want other people to see where you are in the rank." She believes that this kind of status comparison generates unhelpful stress, which creates more of a barrier.

Another important factor was family income. "We found that, for every \$10,000 or greater in family income, the barrier score moved down significantly," she says.

Finally, the researchers found that fitness trackers were a strong predictor. "If they were not tracking their activity, they were experiencing more barriers," she says.

While it is difficult to draw direct cause-effect conclusions based on these results, it does give Capan and her team important insight into where to start focusing their efforts. "Hopefully, this is the beginning of a research branch that focuses on early recognition of barriers and addressing those in a targeted way, whether it's a wearable device or platform or some sort of personalized health information technology," she says.

Chung also sees the importance of shifting the way that nurses are trained. "It's a more holistic way of thinking—how can they take care of themselves? How can they balance their work and life?" she says.

"This work is just one example of what can be done if we —if nurses and engineers—approach a problem together and bring in additional key expertise, like we did from the UMass Amherst Department of Kinesiology," says Capan.

More information: Muge Capan et al, Analysis of multi-level barriers to physical activity among nursing students using regularized regression, *PLOS ONE* (2024). [DOI: 10.1371/journal.pone.0304214](https://doi.org/10.1371/journal.pone.0304214)

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