### Original Research Article

# THE PRACTICE OF STANDARD PRECAUTIONS AMONG NURSES IN OUR LADY OF LOURDS IHIALA, ANAMBRA STATE

# ABSTRACT

### *INTRODUCTION:*

Pathogens drift throughout a hospital-patients, visitors, even the staff who scrub the floors-yet nurses bear the lion's share of risk because they take position at a bedside the moment a new person arrives and typically remain there until the final bandage is removed. Because they seldom stray far, the routine hand-hygiene drills the team labels Standard Precautions become the wards strongest shield against the resilient microbes lurking in every corner. Even though standard precautions (SPs) matter so much for safety, compliance often drifts off course in busy hospital wards.

### *AIM OF STUDY:*

To clarify the issue, this study mapped both knowledge and day-to-day application of SPs among nurses at Our Lady of Lourdes Catholic Hospital in Ihiala, Anambra State, Nigeria.

### *METHOD:*

Adopting a descriptive cross-sectional approach, the research team surveyed eighty-nine nurses using a self-administered structured questionnaire. The instrument gathered basic demographic data and then examined the understanding and practice of hand hygiene, personal protective equipment (PPE), and waste disposal. Responses were analysed with simple descriptive statistics and reported as frequencies and percentages.

### *RESULT OF STUDY:*

Almost all participants (93.3%) had heard of SPs and 91.0% stated they knew the different components. That self-assurance, however, hides a serious shortfall; thorough comprehension of hand hygiene was noted in 62.9%, PPE in 48.3%, and waste disposal in only 29.2%. While 98.9% claimed to wash or sanitise their hands, just 55.1% did so at every critical moment. Use of PPE was inconsistent: 71.9% always wore gloves, 62.9% a mask, yet no nurse consistently applied eye protection. A recent audit shows that only 58.4 percent of healthcare workers put sharp waste in the right container, and a dismal 16.9 percent separate general rubbish as the law requires.

### *CONCLUSION:*

Although many nurses claim familiarity with basic safety steps, their day-to-day habits still fall short of accepted benchmarks. Inconsistent understanding of basic protocols, sporadic wear of safety equipment, and hurried, careless sorting of waste still persist. When viewed collectively, the statistics call for continuous training, reliable provision of materials, and resolute management to improve adherence and reduce hospital-acquired infections.

### Keywords: Nurses, Practice, Precautions, Anambra, Standard

# 01 INTRODUCTION

Nursing knowledge and compliance with standard precautions are important for preventing healthcare-associated infections (HAIs) and protecting nursing personnel and patients from exposure to infectious microorganisms (Da'she et al., 2023). Healthcare environments are one of the most hazardous occupational settings (Da'she et al., 2023; Moore & Kaczmare, 1990; Ndejjo & Musinguzi, 2015). Healthcare professionals regularly encounter biological hazards during their clinical practice, which exposes them to various microorganisms that can cause fatal infections (Twitchell & Wachs, 2003). Standard precautions are the simple, routine habits that slow the spread of germs within hospitals and clinics (Batran et al. 2018). They apply to every patient-whether the diagnosis is settled or still under investigation, cover hand hygiene, personal protective equipment (PPE), safe injection practices, and proper waste disposal (Ghabayen et al., 2023; El-Enein et al., 2019). Performing these steps is far more than a box-ticking exercise; it is the front-line barrier that keeps patients safe and allows health systems to deliver reliable, high-quality care (Mersal & Keshk, 2016; Efstathiou et al., 2011). A growing number of recent investigations show that nurses working in both hospital wards and outpatient clinics grasp the basics of infection control unevenly and apply them with inconsistent care (Dobrina et al., 2023; Al-Faouri et al., 2021; Mersal & Keshk, 2016). Adherence springs from personal qualities, such as knowledge, attitude, and prior training-yet it also bends under the pressure of workplace realities like long shifts, dwindling supplies, and a safety culture that greets nurses every morning (Tepetaş et al., 2023; Kim & Park, 2023; Kim & Lee, 2021; Quan et al., 2015).

In Nigeria, and especially in Anambra State, following basic health safety steps needs a closer look. Shortages of gloves, soap, and other supplies, huge patient numbers, plus uneven training usually keep nurses from sticking to the rules (Ridge et al., 2019). Inside this scene, Our Lady of Lourdes Hospital in Ihiala presents both clear hurdles and hopeful chances to improve everyday infection control. Given the problems already outlined, a swift look at nurses’ standard precautions at Our Lady of Lourdes Hospital in Ihiala, Anambra State, is both necessary and justifiable. The paper surveys workers' knowledge, attitudes and compliance, and identifies concrete barriers and supports that influence their routine practice. Findings can then direct focused training, better supply management, and policy tweaks that protect patients and staff alike. Because the study centres on one facility, it offers a detailed idea of current gaps and future opportunities that may steer broader infection control efforts across the region.

# 02. PURPOSE OF STUDY

# 03. METHODOLOGY

**3.1 Research Design**

This study rolled out a simple cross-sectional survey because the team wanted a quick, snapshot look at what nurses know and do about standard infection precautions. The method collects numbers, presents a current overview, and flags everyday habits without meddling in the ward.

**3.2 Study Area**

The author's concentration was within the Our Lady of Lourdes Catholic Hospital, ihiala, in Anambra State. Known locally for steady, hands-on care, the centre also offers a wide menu of medical services. Round-the-clock nurses move through every ward, and that constant watch made the site a fitting stage to observe how staff follow infection-control rules.

**3.3 Target Population**

The authors concentrated on only registered nurses whose names were listed on the hospital payroll. the nurses stand by the patients' beds during their jobs, so they become frontline protectors against diseases and infections.

**3.4 Sampling size**

**Ninety-nine nurses** accepted to participate, and selective sampling was used to invite the health workers who were on duty and rendering care services when the structured questionnaire was given out. That was necessary to help the authors communicate with the staff to provide the quickest and important answers.

**3.5 Instrument for Data Collection**

The lead researcher put together a quick, self-filled survey that became the main way to collect facts. The short form mixed closed questions and multiple-choice options, divided into five easy-to-follow parts:

* Socio-demographic data
* Knowledge of standard precautions
* Practice of hand hygiene
* Use of personal protective equipment (PPE)
* Waste management strategies

Questions were lifted from earlier published studies on standard precautions, and the draft was pre-tested to make sure each item worked and gave steady scores.

**3.6 Validity and Reliability of the Instrument**

Before printing, nursing and infection-control experts reviewed the draft to check that nothing important was missing. Their comments were added, and a small pilot with nurses from a similar hospital then tested reliability, showing high internal consistency.

**3.7 Method of Data Collection**

After getting the green light from hospital leaders, the research team walked around the wards and handed out paper questionnaires. Each volunteer first read a plain info sheet, said yes, then tackled the questions on their own. They were reassured that answers would stay private and were given as long as needed, so nobody felt hurried or tempted to peek at a neighbour's sheet.

**3.8 Method of Data Analysis**

Once all forms were returned, researchers entered the data into Microsoft Excel and ran straightforward descriptive stats-frequencies and percentages see what the numbers revealed. Results appear in clear tables that let anyone glance at the main points. Analysts focused on how much knowledge respondents had about standard precautions and how often they used those practices on the job.

**3.9 Ethical Considerations**

The hospital's board and the site's research ethics committee both approved the study.

* Every participant signed a simple consent form before taking part.
* Joining the study was completely voluntary, and all data stayed confidential.
* No names, staff IDs, or other details that could trace answers back to a person were ever collected.

**3.0 RESULTS**

**Table 1: Socio-demographic characteristics of the respondents, n=89**

|  |  |  |
| --- | --- | --- |
| **Variables** | **Frequency** | **Percentage** |
| 18-27years  28-37years  38-47years  48years and above | 62  22  4  1 | 69.9  24.7  4.6  1.1 |
| Gender  Male  Female | 34  55 | 38.2  61.8 |
| Marital status  Single  Married  Separated  Divorced  widowed | 56  28  2  2  1 | 63.6  31.8  2.3  2.3  1.1 |
| Duration of work as a nurse  1-5  6-10  11-15  26-30 | 70  15  3  1 | 78.7  16.9  3.4  1.1 |

Table 1 gives a quick socio-demographic features of the research group. Of the 89 participants, 62 volunteers around age twenty-two were 18-27 years (69.9%), whereas 22 were mostly in their thirties and ranged in the 28-37 years (24.7%). Gender counts show 34 people who identify as male (38.2%) and 55 as female (61.8%). Turning to marital status, 56 participants are single (63.6%), 28 are married (31.8%), and regarding work history, 70 nurses-78.7%-hold less than five years on the wards, leaving only 15 staff (16.9%) with six to ten years in the field.

**Table 2: Knowledge of standard precaution n=89**

|  |  |  |
| --- | --- | --- |
| **Questions** | **Frequency** | **Percentage** |
| Have you ever heard about the practice of Standard Precautions  Yes  No | 83  6 | 93.3  6.7 |
| Do you know the elements of Standard Precautions?  Yes  No | 81  8 | 91.0  9.0 |
| If yes to the question above, list them.  Hand washing  waste disposal  Personal protective equipment (PPE  Safe injection practices | 56  26  43  15 | 62.9  29.2  48.3  16.8 |
| Have you ever had training on Standard Precautions?  Yes  No | 74  15 | 83.1  16.9 |
| If yes to the above question, how long ago were you trained?  1-2years  3-4  5-6  7years ago and above | 40  22  7  4 | 44.9  24.7  7.9  4.5 |
| Do you think you are at risk of acquiring diseases/infections by virtue of working in the hospital  Yes  No | 81  8 | 91.0  9.0 |
| Are there any diseases you fear most contacting when providing nursing care  Yes  No | 81  8 | 91.0  9.0 |
| List the possible infections that nurses are exposed in their work place  Lassa fever  Ebola  HIV/AIDS  Tuberculosis  Chicken pox  Hepatitis B  Trichomonas  Mumps  Yellow fever  Syphilis | 68  52  66  58  1  59  2  3  4  3 | 76.4  58.4  74.2  65.2  1.1  66.3  2.2  3.3  4.5  3.3 |

Table 2 contains information on knowledge of standard precautions among the nurses. It shows that 83(93.3%) have heard about the phenomenon, and 81(91.0%) claimed that they know the elements thereof. The respondents identified only four components of standard precautions. Thus Hand washing 56(62.9%), waste disposal 26(29.2%), Personal protective equipment (PPE) 43(48.3%) and Safe injection practices 15(16.8%). 74(83.0%) claimed that they had received training on standard precautions. 40(44.9%) had training 1-2years ago, 22(24.7%) had training 3-4years ago, and 7(7.9%) had training 5-6years ago while 4(4.5%) had theirs up to 7years ago or more. 81(91.0%) thought that they were at risk of contracting by virtue of their roles as nurses. 68(76.4%) identified Lassa fever as one of the infections that could be contracted in the workplace. 52(58.4%) identified Ebola, 66(74.2%) identified HIV/AIDS, 58([65.%](mailto:65.@%25)) answered tuberculosis, 59(66.3%) identified hepatitis B.

**Table 3: Practice of standard precaution- hand hygiene n=?**

|  |  |  |
| --- | --- | --- |
| **Questions** | **Frequency** | **Percentage** |
| Do you perform hand hygiene when providing nursing care?  Yes  No | 87  0 ? | 98.9  0.0 |
| If yes to the above question, which of hand hygiene do you use?  Washings hands with water and soap for 10-15 seconds  Rubbing hands with about 5mls of alcohol based hand rub  Wash hands with water only | 76  6  8 | 85.4  5.6  9.0 |
| How often do you perform hand hygiene when delivering care  (a)Before and after contact with each patient  (b) Before and after performing any procedure between patient or on the same patients  (c) Before putting on gloves and after removing gloves  (d) After handling contaminated objects/materials  (e) All of the above  (f) None of the above  No response | 15  6  2  2  49  0  14 | 18.0  6.7  2.2  2.2  55.1  0.0  15.7 |

Table 3 shows the practice of standard precautions, specifically hand hygiene, among the study respondents. It shows that 87 (98.9 %) performed hand hygiene. 76 (85.4 %) washed hands with water and soap for 10-15 seconds, 6 (5.6 %) rubbed hands with about 5mls of alcohol-based hand rub, and 8 (9.0 %) washed hands with water only. When asked how often they perform hand hygiene when delivering care, 15 (18.0 %) washed before and after contact with each patient, 6 (6.7 %) answered before and after performing any procedure between patient or on the same patients, 2 (2.2 %) answered before putting on gloves and after removing gloves, 2 (2.2 %) answered after handling contaminated objects/materials, while 49 (55.1 %) agreed that hand hygiene should be performed in all the listed conditions.

**Table 4: Practice of use of Personal protective equipment**

|  |  |  |
| --- | --- | --- |
| **Questions** | **Frequency** | **Percentage** |
| How often do you use gloves when doing procedures that require it?  Always  Only when gowns are available  Sometimes  Rarely  I don’t use gloves | 64  6  13  1  1 | 71.9  6.7  15.3  1.2  1.2 |
| How often do you use masks when doing procedures which are likely to generate splashes?  Always  Only when masks are available  Sometimes  Rarely  I don’t use masks | 56  18  11  4  0 | 62.9  20.2  12.4  4.5  0.0 |
| How often do you use goggles/eye protection when doing procedures that are likely to generate splashes?  Always  Only when goggles are available  Sometimes  Rarely  I don’t use goggles | **0**  52  20  13  4 | **0.0**  58.4  22.5  14.6  4.4 |

Table 4 shows the practice of personal protective equipment among the nurses. only 64 (71.9%) wore gloves always, and 56 (62.9 %) always wore masks when doing procedures which are likely to generate splashes, while nobody wore indicating wearing goggles always when procedures require it.

**Table 5: Waste Management**

|  |  |  |
| --- | --- | --- |
| **Questions** | **Frequency** | **Percentage** |
| How do you manage sharps after using on the patients?  The needle and syringe are disposed of immediately after use into a puncture-resistant container  The needle is recapped before disposing of the needle and syringe  Syringe and needle are disposed of together with other waste into available waste containers  The needle is bent before disposing of the needle and syringe into a puncture resistant container | 52  35  2  0 | 58.4  39.4  2.2  0.0 |
| How do you manage solid waste generated during the provision of nursing care  Waste is disposed of into available containers after segregating  Waste is disposed of into available containers without being segregated | 15  74 | 16.9  83.1 |

Table 5 shows practice on management of sharps and it shows that 52 (58.4 %) dispose the needle and syringe immediately after use into a puncture resistant container, 35 (39.4 %) recapped the needle before disposing of the needle and syringe while, 2 (2.2 %) dispose the syringe and needle together with other waste into available waste containers.

# ****04. DISCUSSION OF FINDINGS****

#### This study was conducted at Our Lady of Lourdes Hospital complex, Ihiala, and the study examined the health workers, especially the nurses, about their familiarity with the practices of standard infection control and how to apply them in daily activities in their respective units. This study unveils the power and some weaknesses while highlighting healthcare infections, thereby providing a safe workplace for everyone. About 93.3 percent reported having heard about the standard precautions, also 91.8% had in-depth knowledge about it. The numerical statistics reassure and point out some minor trends in previous studies outside and within Nigeria. Gbabayen et al. (2023) indicated a comparable familiarity rate of 94.6% among these nurses. Despite the high self-reported knowledge, far fewer staff could name each essential component- respiratory hygiene, safe injection practices and, above all, hand hygiene- suggesting that understanding may be wide but rather shallow. This mismatch between perceived mastery and true command of detail has also been observed in other clinical settings. Alwabr and Al-Salehi (2022) observed a nearly identical pattern: nurses expressed broad comfort with SPs, yet the vital specifics eluded them, leading to uneven application at the bedside. Awareness certainly provides a solid foundation; however, ongoing refresher classes and continuous professional development are still necessary if that understanding is to translate into consistent, safe everyday conduct. Hand washing remains the bedrock of any serious plan to stop germs from spreading. Inside that same group, 98.9 percent of caregivers reported cleaning their hands while caring for patients’ number that aligns with the World Health Organizations tip sheet from 2009. Still, only 55.1 percent stuck to the complete routine: scrub before and after every patient, after touching anything messy, and right before and after taking off gloves. That gap highlights the well-known divide between knowing the rules and putting them into practice each time. The same pattern appears in investigations elsewhere, example, Biruk et al. (2018) reported that 90.2% of Ethiopian nurses acknowledged hand hygiene as essential, yet only 52.2% did it consistently. More concerning, none of the staff surveyed here said they consistently wore goggles or other eye shields. Examining closely, 71.9 per cent of the respondents consistently used gloves, while 62.9 used facemasks during their task. The number matches with the study (Kim and Park, 2023), which showed that perceived risk, the volume of work, and the culture of the hospital greatly dictated the Personal protective equipment practices in South Korea by the nurses. This finding hints at either ignorance about why such gear matters or a simple lack of supply, mirroring Abukhelaif's (2019) report of poor goggle use among nurses in Saudi Arabia. In reality, eyewear is the first line of defence against splash exposure to blood and other pathogens during patient work. Safe handling of clinical waste, especially sharp items, is equally crucial for stopping accidental sticks and the onward spread of germs. In the present study, 58.4 percent dropped used needles into puncture-proof bins right away, a rate that matches WHO advice (2014). Yet 39.4 percent still recapped needles- a step experts warn against because it raises the chance of needle stick injuries (CDC, 2020). Even more concerning, only 16.9 percent sorted general and infectious solids before throwing them out. Weak segregation undercuts every other control measure and exposes staff, patients, and waste handlers to cross-contamination in sensitive areas such as hospitals. Similar work in Nigeria by Ogoina et al. (2015) found the same problem, linking low compliance to scarce supplies, poor training, and lax enforcement of policy. A noteworthy 91.0% of nurses surveyed acknowledged feeling open to infection during their shifts. This sense of vulnerability usually drives them to follow basic safeguards. However, studies reveal that awareness in itself seldom changes behavior unless underpinned by excellent training, readily available supplies, and solid institutional backing (Tepetaş et al., 2023; Lim et al., 2021).

# Conclusion

#### This reveals that health workers at Our Lady of Lourdes Hospital grasp the foundational concepts of standard precautions, yet the uses remain an issue. The bulk of errors appears at key moments in hand hygiene, during the sporadic yet vital use of goggles, and in the correct segregation of clinical waste. These missteps mirror trends observed in hospitals worldwide and point to the need for routine refresher courses, dependable supplies, strong managerial support, and straightforward prompts that turn sound practice into automatic behaviour. Money spent on ongoing classes and on fixing supply or staff problems will pay off by lifting compliance and cutting health care-associated infections (HAIs). The study backs earlier work showing that knowing the rules is only half the battle; turning knowledge into daily practice calls for changes in both the way a hospital runs and the culture its people live in.

# Recommendation

# COMPETING INTERESTS DISCLAIMER:

#### Authors have declared that they have no known competing financial interests OR non-financial interests OR personal relationships that could have appeared to influence the work reported in this paper.

# References

Abou El-Enein, N. Y., & El Mahdy, H. M. (2011). Standard precautions. *Journal of the Egyptian Public Health Association*, *86*(1 & 2), 3–10. <https://doi.org/10.1097/01.epx.0000395430.92943.69>

Al-Faouri, I., Okour, S. H., Alakour, N. A., & Alrabadi, N. (2021). Knowledge and compliance with standard precautions among registered nurses: A cross-sectional study. *Annals of Medicine and Surgery*, *62*, 419–424. <https://doi.org/10.1016/j.amsu.2021.01.058>

Al-Sultani, M. Ogoina, D., Pondei, K., Adetunji, B., Chima, G., Isichei, C., & Gidado, S. (2015). Knowledge, attitude and practice of standard precautions of infection control by hospital workers in two tertiary hospitals in Nigeria. *Journal of Infection Prevention*, *16*(1), 16–22. <https://doi.org/10.1177/1757177414558957>

Alwabr, G. M. A., & Al-Salehi, K. A. S. (2022). Knowledge and Practice of Nurses towards Standard Precautions of Infection Control in Government Hospitals of Sana’a City, Yemen. *Journal of Health Science Research*, 16–23. <https://doi.org/10.7324/jhsr.2022.724>

Ayed, A., Batran, A., Salameh, B., Ayoub, M., & Fasfous, A. (2018). Are standard precautions for hospital-acquired infection among nurses in public sector satisfactory? *Archives of Medicine and Health Sciences*, *6*(2), 223. <https://doi.org/10.4103/amhs.amhs_84_18>

Da'seh A, Al-Zaru I, Hayajneh A, Obaid O. (2023) The Nurses' Knowledge and Compliance with Standard Precautions to prevent Healthcare-associated Infections. *Open Nurs J,* 17: e187443462306231. <http://dx.doi.org/10.2174/18744346-v17-e20230711-2023-3>

Dobrina, R., Donati, D., Giangreco, M., De Benedictis, A., Schreiber, S., Bicego, L., Scarsini, S., Buchini, S., KWOK, S. W. H., & Lam, S. C. (2023). Nurses’ compliance to standard precautions prior to and during COVID‐19. *International Nursing Review*, *71*(1), 20–27. <https://doi.org/10.1111/inr.12830>

E.E. Abukhelaif, A. (2019). Personal Protective Equipment Knowledge and Practices among Nurses Working at Al-Baha King Fahad Hospital, Saudi Arabia. *Journal of Healthcare Communications*, *04*(01). <https://doi.org/10.4172/2472-1654.100152>

Efstathiou, G., Papastavrou, E., Raftopoulos, V., & Merkouris, A. (2011). Compliance of Cypriot nurses with Standard Precautions to avoid exposure to pathogens. *Nursing &amp; Health Sciences*, *13*(1), 53–59. <https://doi.org/10.1111/j.1442-2018.2011.00576.x>

Ghabayen, F., ALBashtawy, M., Abdelkader, R. H., Jarrah, S., Eshah, N., Abdalrahim, A., Saifan, A., Alkhawaldeh, A., Rayan, A., Ayed, A., Al-Amer, R., Mohammad, K. I., Al-Dwaikat, T., Omari, O. A., ALBashtawy, S., ALBashtawy, B., & Dameery, K. A. (2023). Knowledge and Compliance With Standard Precautions Among Nurses. *SAGE Open Nursing*, *9*. <https://doi.org/10.1177/23779608231189966>

Kim, J., & Park, H. (2023). The Influence of Knowledge on Standard Precautions, Nursing Professionalism, and Organizational Culture for Infection Control on Hospital Nurses’ Performance with Guidelines for Standard Precautions. *Journal of Korean Academy of Fundamentals of Nursing*, *30*(2), 225–235. <https://doi.org/10.7739/jkafn.2022.30.2.225>

Kim, S. J., & Lee, E. J. (2021). Factors Influencing Emergency Department Nurses’ Compliance with Standard Precautions Using Multilevel Analysis. *International Journal of Environmental Research and Public Health*, *18*(11), 6149. <https://doi.org/10.3390/ijerph18116149>

Mersal, F., & Keshk, L. (2016). Compliance to standard precautions among nurses working  in Qassim hospitals in KSA. *International Journal of Basic and Applied Sciences*, *5*(4), 210–214. <https://doi.org/10.14419/ijbas.v5i4.6832>

Moore RM Jr, Kaczmarek RG. (1990) Occupational hazards to health care workers: Diverse, ill-defined, and not fully appreciated. *Am J Infect Control* 18(5): 316-27.

Ndejjo R, Musinguzi GYuX, (2015) Occupational health hazards among healthcare workers in Kampala, Uganda. *J Environ Public Health* 913741.

Quan, M., Wang, X., Wu, H., Yuan, X., Lei, D., Jiang, Z., & Li, L. (2015). Influencing Factors on Use of Standard Precautions Against Occupational Exposures to Blood and Body Fluids among Nurses in China. In *PubMed*.

Ridge, L. J., Dickson, V. V., & Stimpfel, A. W. (2019). The Occupational Health of Nurses in the Economic Community of West African States: A Review of the Literature. *Workplace Health &amp; Safety*, *67*(11), 554–564. <https://doi.org/10.1177/2165079919859383>

Tepetaş, M., Unsal, A., Kılınç, A., Oznur Muz, F. N., Arslantaş, D., & Kuçuk, H. (2023). Evaluation of Compliance with Standard Precautions and Burnout Levels of Nurses working in a University Hospital. Standard Precautions and Burnout Levels of Nurses. *Asian Journal of Nursing Education and Research*, 105–110. <https://doi.org/10.52711/2349-2996.2023.00023>

Twitchell KT, Wachs JE. Bloodborne pathogens. AAOHN J 2003; 51(1): 38-47.

Zerfu, Biruk, Tesfu Kassa, Gezahegne Mamo, and Mengistu Legesse. (2024) "Knowledge, attitude, and practices of the community about Chikungunya in selected Districts of Afar Region, Northeast Ethiopia; its implications for controlling the disease: a community-based quantitative and qualitative cross-sectional study." *BMC Public Health* 24, no. 1 3441.