

DETERMINANTS OF NATIONAL HEALTH INSURANCE RETENTION AMONG INFORMAL WORKERS IN PHNOM PENH, CAMBODIA

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Abstract: This study aimed to investigate the determinants of Retention in National Health Insurance (NHI) in Cambodia, among the informal workers in Phnom Penh, Cambodia. Surveys of 424 informal workers in Phnom Penh from September to October 2024 were conducted. Multivariate logistic regression analyses were performed to assess the factors associated with NHI retention among the informal workers. The results revealed that having completed secondary school or higher, working in industrial or service sectors, perceiving high technical and interpersonal quality of healthcare, perceiving comprehensive benefit coverage, and perceiving good availability of healthcare services were significantly associated with retention in the NHI scheme. Additionally, participants with a good level of knowledge about the benefit package were more likely to maintain active membership. It was concluded that while socio-economic and accessibility factors play a critical role, motivational and ability-related factors, such as knowledge of benefit packages, positive perceptions of service quality, and attitudes toward coverage, substantially influence informal workers' decision to remain enrolled in the scheme. Improving awareness of benefit entitlements and promoting the technical and interpersonal aspects of healthcare quality through targeted health education interventions may enhance NHI retention among informal workers

Keyword: Cambodia, informal workers, national health insurance, retention, universal health coverage, social health insurance

Introduction

Achieving universal health coverage (UHC) remains a significant goal for many low- and middle-income countries, including Cambodia (Trisnasari, Laosee, Rattanapan, & Janmaimool, 2023). UHC aims to provide all individuals access to comprehensive healthcare services without financial hardship (Sanogo, Fantaye, & Yaya, 2019). It is a key objective under the Sustainable Development Goal (SDG) No. 3, particularly crucial for Low- and Middle-Income Countries (LMICs) where high out-of-pocket (OOP) healthcare expenses contribute to financial distress (Gera, Narwal, Jain, Taneja, & Gupta, 2018; Robert John Kolesar, Bogetoft, Chea, Erreygers, & Pheakdey, 2022). OOP healthcare payments in Southeast Asia remain a heavy economic burden, with OOP spending making up 40% of health expenditures, far above the World Health Organization (WHO) 15 to 20% benchmark. As a result, about 310 million people, 16% of the population, face catastrophic health costs, exceeding 10% of their household budget (Tandon et al., 2021). Social Health Insurance (SHI) has emerged as a viable financial mechanism to achieve UHC by pooling risks and reducing OOP expenses (Lim, Kamaruzaman, Wu, & Geue, 2023).

Many LMICs have adopted SHI programs, demonstrating positive outcomes in healthcare utilization and financial protection (Erlangga, Suhrcke, Ali, & Bloor, 2019). However, these programs face low enrollment rates, affordability concerns, administrative inefficiencies, and a lack of awareness (James & Acharya, 2022). Previous studies have looked at barriers to health insurance enrollment and service

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use in Cambodia, but few have focused on why informal sector workers stay in the NHI system (Robert J Kolesar et al., 2020). Despite these efforts, challenges remain in expanding coverage, particularly among informal workers, due to issues such as affordability, awareness, and accessibility (Kwon & Keo, 2019). Since 2016, NSSF Cambodia has managed a SHI program that serves both formal and informal workers. This program offers a wide range of comprehensive benefits, including preventive, curative, rehabilitative, and promotional healthcare services. It also provides coverage for chronic diseases, such as diabetes, heart conditions, and mental health disorders (GOV, 2024; manet, 2023). Despite these benefits, concerns about financial sustainability and high dropout rates among informal workers persist. Recent trends indicate a rise in inactive NSSF members, with 14,339 members recorded as inactive by the end of December 2023 (Fund, 2023). Key reasons for dropouts from the previous study include financial constraints, dissatisfaction with the quality of healthcare, alternative insurance options, forgetfulness in making payments, and limited awareness of digital payment methods (Toleha & Bayked, 2023). Additionally, lower education levels, female gender, and lack of dependents have been linked to higher dropout rates (Trisnasari et al., 2023). The financial sustainability of the program is at risk, as rising medical costs have outpaced contribution increases. In 2023, medical expenses surged by 54.17%, while average contributions increased by only 23.95% (Fund, 2023, 2024). Phnom Penh has the highest concentration of informal NSSF members, with 23.84% reported as non-contributors in April 2024 (Fund, 2024). Understanding the factors influencing retention is critical. This study aims to investigate the key determinants of NSSF retention among informal workers in Phnom Penh, contributing to policy recommendations for improving membership sustainability and ensuring long-term financial security for insured individuals.

Materials and Methods

Study design and participants

Data collection was conducted using a structured, self-administered questionnaire adapted from existing validated instruments. The questionnaire was sent to four experts in the related field (i.e., research measurement, health social sciences, and behavioral sciences) to evaluate whether each questionnaire item covered the meanings included in a study variable and to evaluate the difficulty and ambiguity of items. The item-objective congruence (IOC) was calculated to validate each questionnaire item. An IOC above 0.5 was considered acceptable. After completing the proper questionnaire, which, according to the study, was conducted in Kampot province, the questionnaire was translated into the Khmer language by the English academic translator and translated back into English. The questionnaire was pre-tested on 30 participants who met the eligibility criteria (NSSF participants, informal workers, and adults over the age of 17) in the Kampot province. After the questionnaires were pre-tested, the results were modified terminologically and contextually based on the findings of any unfit terms in the questionnaires. The reliability of the data collection was tested using Cronbach's alpha with Statistical Package for Social Sciences (SPSS) software for Windows, version 25 (SPSS Inc., Chicago, Illinois, USA). Cronbach's alpha value for attitude towards the NHI section is 0.910, and the perceived quality of service of the providers is 0.898, and these were considered acceptable for internal consistency (Cronbach's alpha values greater than 0.7). This study utilized a cross-sectional design conducted between September and October 2024 among NSSF members in Phnom Penh, Cambodia. Participants were recruited from three districts: Meanchey, Russey Keo, and Kambol, with a focus on informal

workers in markets, tuk-tuk driver associations, and areas near factories. Proportional sampling was employed to ensure a representative distribution of participants. The inclusion criteria required participants to be 18 years or older, registered NSSF members residing in Phnom Penh, and willing to provide informed consent. Exclusion criteria included individuals unwilling to consent or those experiencing cognitive impairments that hindered their participation. The sample size was determined using Cochran's formula, resulting in an initial calculation of 384 participants. A 10% adjustment for potential dropouts increased the final sample size to 422 participants. While this study's cross-sectional design allows for the examination of associations at a single point in time, it does have limitations in establishing causality between the identified factors and NHI retention. Furthermore, since the sample was limited to informal workers in Phnom Penh, the generalizability of the results to other regions of Cambodia may be constrained. Additionally, recall bias may have affected participants' responses regarding their past experiences with healthcare services and insurance benefits.

Data analysis

Data entry was performed using Epi Data version 3.1, and statistical analysis was conducted using SPSS version 25. Descriptive statistics, including medians and quartile deviations, were calculated. The Kolmogorov-Smirnov test was used to assess data normality. Chi-square statistics and bivariate logistic regression were applied to examine associations between NHI retention and independent variables. Independent variables with a p-value <0.25 in bivariate analysis were included in multiple logistic regression models. The adjusted odds ratio (AOR) with a 95% confidence interval (CI) was used to determine significant predictors, with statistical significance set at $p \leq 0.05$. Ethical approval was obtained from the Mahidol University Institutional Review Board (MU-CIRB 2024/344.2208). Data collection procedures ensured confidentiality through signed agreements by research assistants, anonymized responses, and secure storage of collected data for three years post-study.

Results and Discussion

The characteristics of 424 participants were included in the study, recruited from three districts in Phnom Penh, Cambodia: Russey Keo (51.4%), Kamboul (27.4%), and Mean Chey (21.2%). The majority of participants were female (66.3%), with 52.6% aged above 31 years. Educational attainment varied among respondents, with 40.3% having completed higher education, while 4.2% had no formal education. In terms of income, 72.4% reported a monthly income ranging from 810,000–1,200,000 KHR, and occupational distribution revealed that 34.4% were employed in the industrial sector, 23.1% in services, and 42.5% in other informal jobs.

Table 1: Frequency and percentage of sociodemographic characteristics

| Sociodemographic characteristics | Frequency (n) | Percentage (%) |
|----------------------------------|---------------|----------------|
| Study area | | |

| | | |
|-----------------------------------|-----|------|
| Russey Keo | 218 | 51.4 |
| KamBoul | 116 | 27.4 |
| Mean Chey | 90 | 21.2 |
| Age group (year) | | |
| ≤ 31 | 201 | 47.4 |
| > 31 | 222 | 52.6 |
| Median 31, QD 5.5, Min 18, Max 76 | | |
| Sex | | |
| Male | 143 | 33.7 |
| Female | 281 | 66.3 |
| Level of Education | | |
| No schooling | 18 | 4.2 |
| Primary education | 104 | 24.5 |
| Secondary education | 131 | 30.9 |
| Higher education | 171 | 40.3 |
| Income Level | | |
| ≤ 800,000 KHR | 33 | 7.8 |
| 810,000-1,200,000 KHR | 307 | 72.4 |
| >1,200,000 KHR | 84 | 19.8 |
| Occupation | | |

| | | |
|------------|-----|------|
| Industries | 146 | 34.4 |
| Services | 98 | 23.1 |
| Other | 180 | 42.5 |

Remark 1: (1 USD = 4074 KHR, based on May 2024, National Bank of Cambodia)

The perceived health risks reported by the respondents are detailed in Table 2. Participants answered three questions about their self-rated health status, recent experiences with illness, and history of chronic diseases. For assessing self-rated health status, respondents used a scale from 1 to 5. The mean score was then calculated to categorize health as either good (≥ 4) or poor (< 4). A majority of respondents reported good health, with 78.7% indicating a positive health status, while 21.3% described their health as poor. Most had not experienced recent illnesses, with 85.1% indicating no recent issues, and 14.9% reported chronic conditions. Regarding NSSF services, 86.4% rated them as good, and 77.3% were satisfied with the helpfulness of staff in addressing queries. Participants also praised the speed and efficiency of NSSF staff, with 77.3% rating their performance positively. The clarity and transparency of the information provided received the highest ratings, with 91.5% of respondents viewing it as good or very good. Only 8.5% rated the information as fair or poor.

Table 2: Perceived Health Risks of Respondents

| Individual Characteristics | Frequency (n) | Percentage (%) |
|---|---------------|----------------|
| The self-rated health status | | |
| Very Good | 23 | 5.4 |
| Good | 311 | 73.3 |
| Fair | 25 | 5.9 |
| Poor | 47 | 11.1 |
| Very Poor | 18 | 4.2 |
| History of recent illnesses or accidents in the last 3 months | | |
| Yes | 225 | 53.1 |

| | | |
|---|-----|------|
| No | 199 | 46.9 |
| Chronic diseases: stroke, hypertension, diabetes, cardiovascular disease, or chronic respiratory disease in the past 3 months confirmed by the physician. | | |
| Yes | 63 | 14.9 |
| No | 361 | 85.1 |
| The overall services provided by the NSSF program | | |
| Very Good | 166 | 39.2 |
| Good | 200 | 47.2 |
| Fair | 54 | 12.7 |
| Poor | 3 | 0.7 |
| Very Poor | 1 | 0.2 |
| The helpfulness of the NSSF staff when you have queries or need assistance | | |
| Very Good | 160 | 37.7 |
| Good | 168 | 39.6 |
| Fair | 91 | 21.5 |
| Poor | 3 | 0.7 |
| Very Poor | 0 | 0 |
| Speed and efficiency of the NSSF staff in handling your requests or issues | | |
| Very Good | 154 | 36.3 |
| Good | 174 | 41.0 |

| | | |
|--|-----|------|
| Fair | 88 | 20.8 |
| Poor | 5 | 1.2 |
| Very Poor | 3 | 0.7 |
| The clarity and transparency of the information provided by the NSSF staff | | |
| Very Good | 230 | 54.2 |
| Good | 158 | 37.3 |
| Fair | 31 | 7.3 |
| Poor | 4 | 0.9 |
| Very Poor | 1 | 0.2 |

Table 3. Perceived Quality of Service Provided by the Provider, results showed that a majority of respondents, 67.9%, felt that healthcare providers clearly explained the disease, including its causes and treatment options. None of the respondents strongly disagreed with any statements about their experiences. About 45.3% believed the treatment and medications would aid their recovery, while 44.6% were satisfied with the waiting time at outpatient services. Additionally, 43.9% appreciated the hospitality of healthcare providers, and 66.5% felt staff treated them warmly. Nearly half (44.6%) agreed that physicians were available on their schedules, and 46.9% perceived the facilities as modern with well-maintained equipment.

Table 3: Perceived Quality of Service Provided by the Provider

| Statements | SA | A | N | D | SD |
|--|-----|-----|-----|-------|-------|
| | n | n | n | n (%) | n (%) |
| | (%) | (%) | (%) | | |
| Domain: Technical quality (4 statements) | | | | | |

| | | | | | |
|---|---------------|---------------|--------------|-------------|------------|
| Healthcare providers should clearly explain the disease, including its cause and the treatment process. | 288 (67.9) | 96 (22.6) | 38 (9.0) | 2 (0.5) | 0 |
| The treatment and medicine I received made me recover. | 192 (45.3) | 146 (34.4) | 73 (17.2) | 10 (2.4) | 3 (0.7) |
| The information provided by the staff is clear and transparent | 230 (54.2) | 158 (37.3) | 31 (7.3) | 4 (0.9) | 1 (0.2) |
| The staff efficiently handled my requests and issues on time | 154 (36.3) | 174 (41.0) | 88 (20.8) | 5 (1.2) | 3 (0.7) |
| Domain: Interpersonal quality (3 statements) | | | | | |
| Health providers 'staff (physicians, nurses, administration officers, and pharmacists) serve me in a friendly way | 188 (44.3) | 176 (41.5) | 58 (13.7) | 2 (0.5) | 0 |
| The waiting time from registration until the physician served you at the outpatient service satisfied you. | 189 (44.6) | 182 (42.9) | 48 (11.3) | 5 (1.2) | 0 |
| I admired the hospitality of the healthcare providers (physician, nurse, administration officers, pharmacist) | 186 (43.9) | 170 (40.1) | 55 (13) | 10 (2.4) | 3 (0.7) |
| Domain: Structural quality (3 statements) | | | | | |
| The physician is available according to the polyclinic schedule. | 186 (43.9) | 171 (40.3) | 55 (13) | 9 (2.1) | 3 (0.7) |
| The service is available according to the polyclinic schedule. | 194 (45.8) | 156 (36.8) | 64 (15.1) | 8 (1.9) | 2 (0.5) |
| The facilities were modern, and the equipment was well-maintained during my visit. | 199 (46.9) | 154 (36.3) | 59 (13.9) | 8 (1.9) | 4 (0.9) |
| Domain: Comprehensiveness of coverage (5 statements) | | | | | |

| | | | | | |
|--|---------------|---------------|--------------|-------------|------------|
| The benefits package covers all necessary healthcare services for me. | 203 (47.9) | 145 (34.2) | 63 (14.9) | 11 (2.6) | 2 (0.5) |
| Being a member of NSSF makes healthcare affordable. | 184 (43.4) | 206 (48.6) | 27 (6.4) | 6 (1.4) | 1 (0.2) |
| Enrollment in the NSSF reduces the burden of health care costs. | 198 (46.7) | 162 (38.2) | 53 (12.5) | 11 (2.6) | 0 |
| The NSSF provides a comprehensive benefits package that is widely considered to offer good value for the contributions made. | 183 (43.2) | 170 (40.1) | 60 (14.2) | 11 (2.6) | 0 |
| The enrollment process is easy to follow. | 195 (46.0) | 162 (38.2) | 60 (14.2) | 7 (1.7) | 0 |

Note: SA Strongly agree, A Agree, N Neutral, D Disagree, SD Strongly Disagree

Table 4 Healthcare utilization provides insights into the accessibility of health facilities and the characteristics of health service utilization among respondents. Participants answered a series of questions regarding the healthcare facilities they visited when unwell. The findings indicated that more than half of the respondents preferred the National Hospital, with 225 participants 53.1%, expressing this preference. The Comprehensive Package Activity (CPA) hospital was the second choice, selected by 12.7% of respondents, while private hospitals and other facilities accounted for a combined 34.2% of preferences. Additionally, 42.9% of respondents rated the availability of healthcare services as “very good.” Furthermore, 264 respondents 62.3% reported that they could reach health facilities from their homes in under 30 minutes, while approximately 160 respondents 37.7% took 30 minutes or more to access the nearest facility. In the past 12 months, 255 respondents 60.1% reported utilizing OPD services at a health facility. Among these individuals, 196 respondents 46.2% accessed OPD services between 3 to 5 times. Additionally, 114 respondents 26.9% used OPD services fewer than 3 times, while another 114 respondents 26.6% accessed OPD services more than 5 times during the same period. Notably, nearly 90% of respondents expressed satisfaction with the healthcare facilities operating under the NHI program.

Table 4: Healthcare utilization

| Individual Characteristics | Frequency (n) | Percentage (%) |
|----------------------------|---------------|----------------|
|----------------------------|---------------|----------------|

| | | |
|--|-----|------|
| Type of healthcare facility you visit if you have an illness | | |
| National Hospital | 225 | 53.1 |
| Comprehensive package activity (CPA) hospital | 39 | 9.2 |
| Minimal package activities (MPA) | 15 | 3.5 |
| Private hospital | 136 | 32.1 |
| Other | 9 | 2.1 |
| The rate of availability of healthcare services | | |
| Very good | 182 | 42.9 |
| Good | 152 | 35.8 |
| Fair | 71 | 16.7 |
| Poor | 19 | 4.5 |
| The coverage of healthcare services provided under the NSSF | | |
| Very good | 180 | 42.5 |
| Good | 175 | 41.3 |
| Fair | 64 | 15.1 |
| Poor | 5 | 1.2 |
| Distance to access health facility | | |
| ≤ 5 | 183 | 43.2 |
| 5-15 | 136 | 32.1 |
| >15 | 105 | 24.8 |

| | | |
|--|-----|------|
| Duration of access to health facility | | |
| ≤ 30 | 264 | 62.3 |
| >30 | 160 | 37.7 |
| Rating the accessibility | | |
| Very near | 17 | 4.0 |
| Near | 114 | 26.9 |
| Moderate | 151 | 35.6 |
| Far | 142 | 33.5 |
| Outpatient services in the past 12 months | | |
| 0-2 | 114 | 26.9 |
| 3-5 | 196 | 46.2 |
| >5 | 114 | 26.9 |
| Most recent visit to a health facility in the last 12 months | | |
| Health Checkup | | |
| No | 371 | 87.5 |
| Yes | 53 | 12.5 |
| Utilization of OPD in the past 12 months | | |
| No | 169 | 39.9 |
| Yes | 255 | 60.1 |
| Utilization of IPD in the past 12 months | | |

| | | |
|--|-----|------|
| No | 350 | 82.5 |
| Yes | 74 | 17.5 |
| Been utilizing PNC/ANC/Chronic control in the past 12 months | | |
| No | 286 | 67.5 |
| Yes | 138 | 32.5 |
| Satisfaction with the service for the most recent visit | | |
| Very satisfices | 195 | 46.0 |
| Satisfice | 159 | 37.5 |
| Fair | 59 | 13.9 |

Table 5 outlines the respondents' understanding of the principles underlying the NHI and NSSF. The findings reveal that 87.0% of respondents believe that healthcare providers treat both NHI participants and non-participants fairly. Additionally, 86.6% recognize that the NSSF is designed to protect individuals from the financial hardships associated with high-cost illnesses. Respondents highlighted several key points: 82.1% believe that the healthcare cost-sharing arrangements are reasonable, and 79.5% find the enrollment and retention processes for membership to be user-friendly. Furthermore, 51.9% understand that contributing for six months extends service eligibility by an additional two months, while 50.5% are aware that the NSSF offers a pension scheme after 15 years of contributions.

Moreover, 81.6% acknowledge that healthcare services are accessible through both public and private providers, and an impressive 91.7% state that the NSSF covers services and medications related to antenatal care. A substantial majority of respondents, 92.2%, confirmed that coverage is provided for services and medications related to postnatal care. Additionally, 87.5% expressed appreciation for the availability of both inpatient and outpatient care at no cost. Furthermore, 82.1% acknowledged that preventive care, including vaccinations and screenings, is offered free of charge. Interestingly, 72.4% indicated that the NSSF can reimburse healthcare expenses incurred during emergencies at non-contracted hospitals. However, 71.0% recognized that self-treatment services are not covered. Similarly, 90.8% noted that chemotherapy services are outside the scope. Additionally, 62.5% indicated that cosmetic procedures are excluded, while 74.5% confirmed that dental care services are likewise not included.

Table 5: Knowledge of NHI and Principles of NSSF

| | True | False | Not sure |
|--|---------------|--------------|-----------------|
| Statements | n | n | n |
| | (%) | (%) | (%) |
| The NSSF provided healthcare coverage to each member. | 369 (87.0) | 22 (5.2) | 33 (7.8) |
| NSSF aims to protect people from poverty if they suffer from disease, especially diseases with high costs. | 367 (86.6) | 20 (4.7) | 37 (7.8) |
| The NSSF members shared risk and healthcare costs | 348 (82.1) | 21 (5.0) | 55 (13.0) |
| The NSSF can be registered and retain membership in each branch or head office. | 337 (79.5) | 5 (1.2) | 82 (19.3) |
| A contribution of six months will extend your service by an additional two months. | 220 (51.9) | 14 (3.3) | 190 (44.8) |
| NSSF provides you with a pension scheme after 15 years of contribution. | 214 (50.5) | 10 (2.4) | 200 (47.2) |
| NSSF covers healthcare services at both public and private providers. | 346 (81.6) | 16 (3.8) | 62 (14.6) |
| The NSSF covers the services and medications of antenatal care (ANC). | 389 (91.7) | 12 (2.8) | 23 (5.4) |
| The NSSF covers the services and medications of postnatal care (PNC). | 391 (92.2) | 8 (1.9) | 25 (5.9) |

| | True | False | Not sure |
|---|---------------|--------------|---------------|
| Statements | n | n | n |
| | (%) | (%) | (%) |
| NSSF provides both inpatient and outpatient care. | 371 (87.5) | 8 (1.9) | 45 (10.6) |
| NSSF covers preventive care such as vaccinations and screenings. | 348 (82.1) | 10 (2.4) | 66 (15.6) |
| NSSF will reimburse health care costs when you are in an emergency. | 307 (72.4) | 9 (2.1) | 108 (25.5) |
| NSSF does not provide coverage for self-treatment services. | 301 (71.0) | 11 (2.6) | 112 (26.4) |
| NSSF does not provide coverage for chemotherapy services. | 385 (90.8) | 12 (2.8) | 27 (9.2) |
| The NSSF does not provide coverage for cosmetic treatment. | 265 (62.5) | 4 (0.9) | 155 (36.6) |
| NSSF does not provide dental services. | 316 (74.5) | 75 (17.7) | 33 (7.8) |

Table 5. Multivariable analysis based on the NHI was conducted to identify the significant predictors of NHI retention among NSSF members. The results are presented in Table 3, Education Level demonstrated that participants with secondary or higher education were 4.98 times more likely to retain their health insurance compared to those with primary or no education (AOR = 4.98, 95% CI: 2.92–8.49). This suggests that individuals with higher education levels are more informed about the importance of health insurance and its financial protection benefits, leading to increased retention rates. Employment in industry and service sectors was found to be a borderline significant predictor of NHI

retention (AOR = 1.54, 95% CI: 0.99–2.39). The association was less pronounced than other factors, indicating that structured employment environments may provide incentives or support systems that foster continued participation in insurance plans. Furthermore, the perceived technical quality of healthcare services was significantly correlated with the retention of NHI. Participants who recognized a high level of technical quality were 2.88 times more likely to retain their insurance than those with lower perceptions of quality (AOR = 2.88, 95% CI: 1.63–5.10). Similarly, individuals who perceived high interpersonal quality of healthcare providers were 3.16 times more likely to maintain their insurance coverage than those with lower perceptions (AOR = 3.16, 95% CI: 1.30–7.71). These findings emphasize the critical role of patient satisfaction and service quality in ensuring long-term insurance retention. Participants who perceived the benefit package as comprehensive were 1.97 times more likely to retain their insurance compared to those who viewed it as insufficient (AOR = 1.97, 95% CI: 1.24–3.14). A clearly defined and effectively communicated benefits package enhances confidence in the insurance system, contributing to increased retention rates. Furthermore, the accessibility of healthcare services is significantly correlated with NHI retention. Participants who perceived healthcare services as easily accessible were 2.43 times more likely to retain their insurance compared to those who rated accessibility as low (AOR = 2.43, 95% CI: 1.01–5.83). Access to health services is a critical factor in ensuring sustained participation in health insurance. Participants who possessed a strong understanding of the NHI benefits and limitations were 1.74 times more likely to maintain their coverage compared to those with limited knowledge (AOR = 1.74, 95% CI: 1.07–2.85). Consequently, enhancing communication and public education about the benefits of NHI.

Table 6: Multivariable analysis based on the NHI Retention

| Factors | AOR | 95% CI for COR | | P-value |
|---|------|----------------|-------|---------|
| | | Lower | Upper | |
| <u>Socioeconomics</u> | | | | |
| Level of Education | | | | |
| Ref: No schooling and Primary education | | | | |
| Secondary and Higher Education | 4.98 | 2.92 | 8.49 | <0.001 |
| Occupation | | | | |
| Industries and Services | 1.54 | 0.99 | 2.39 | 0.05 |
| Ref: Other (sell vendor, driver) | | | | |

| Factors | AOR | 95% CI for COR | | P-value |
|---------|-----|----------------|-------|---------|
| | | Lower | Upper | |

| | | | | |
|--|------|------|------|--------|
| <u>Motivation Factors</u> | | | | |
| Perception of the quality of services provided by healthcare providers | | | | |
| Perceived Technical Quality by Respondents | | | | |
| Ref: Low | | | | |
| High | 2.88 | 1.63 | 5.1 | <0.001 |
| Perceived Interpersonal Quality by Respondents | | | | |
| Ref: Low | | | | |
| High | 3.16 | 1.3 | 7.71 | 0.011 |
| Attitude towards the benefits package | | | | |
| Comprehensiveness of coverage under the scheme | | | | |
| Ref: Low | | | | |
| High | 1.97 | 1.24 | 3.14 | 0.004 |
| <u>Opportunity factors</u> | | | | |
| Accessibility of health facilities | | | | |
| The availability of healthcare services | | | | |
| Ref: Poor | | | | |
| Good | 2.43 | 1.01 | 5.83 | 0.045 |
| <u>Ability Factors</u> | | | | |

| Factors | AOR | 95% CI for COR | | P-value |
|--|------|----------------|-------|---------|
| | | Lower | Upper | |
| Knowledge about the benefits package and limitations | | | | |
| Ref: Poor | | | | |
| Good | 1.74 | 1.07 | 2.85 | 0.025 |

Discussion

The study identified a significant correlation between education level and employment type with NHI retention among NSSF members in Phnom Penh. Respondents who had completed secondary education or higher were nearly 4.77 times more likely to maintain their insurance coverage. Findings from a study conducted in southwest Ethiopia and Ghana support this. As previously stated, a higher education level might generate a higher income, easier access to media to gather information, and a deeper understanding of the benefits of health insurance (Adjei-Mantey & Horioka, 2023; Mensah & Yeboah, 2022). This suggests that education enhances an individual's capacity to understand the benefits of health coverage, seek pertinent information, and navigate insurance systems effectively, according to the World Bank for 26 OECD countries (Raghupathi & Raghupathi, 2020). This finding is consistent with the questionnaire items related to the knowledge construct, which examined understanding of benefits, coverage limitations, and NHI usage procedures. Individuals with higher education levels are likely more acquainted with these elements, thereby influencing their decision to retain their membership. Similarly, workers in the industry and service sectors were 2.39 times more likely to maintain NHI coverage compared to those in informal occupations, such as vendors or drivers. Job security and stable income streams are reflected in the demographics of employment types, even though they are not directly addressed in the questionnaire. These findings indicate that employment in formal sectors, often associated with employer-supported health programs and consistent income, contributes to higher retention rates by alleviating the financial and logistical challenges associated with NHI contributions. This trend may be attributed to the stability of employment and the availability of workplace health benefits (Nsiah-Boateng et al., 2019). Previous studies from Indonesia have indicated that formal employment contributes to health insurance retention due to a stable income and employer-sponsored incentives (Dartanto et al., 2020).

Motivational factors affecting retention in NHI programs are closely tied to service quality and perceptions of the benefits package. Respondents who rated the technical quality of care, cleanliness of facility, medical equipment, and professionalism of health facility staff were more likely to stay in the NHI. Specifically, individuals who rated these aspects positively were 2.88 times more likely to continue their membership, highlighting the critical importance of delivering high standards in

healthcare services to NSSF members. A study conducted in Ghana investigated the perceptions of subscribers to the NHI concerning the quality of the services provided. The results demonstrated that individuals who assessed the quality of NHI services as “good” were more inclined to renew their memberships than those who rated the services as “poor” (Nketiah-Amponsah, Alhassan, Ampaw, & Abuosi, 2019). This finding suggests a positive correlation between perceived service quality and the decision to continue NHI membership. Furthermore, the study indicated that enhancements in the technical quality of healthcare provided in primary facilities do not necessarily lead to improved perceptions of care quality among clients. It underscored the necessity of addressing both technical quality and perceived quality to build client confidence and promote greater participation in the NHI (Alhassan et al., 2015; Nsiah-Boateng, Akweongo, Nonvignon, & Aikins, 2024). Similarly, the interpersonal quality of health workers, reflected in their politeness, respect, and attentiveness, from health care providers, also influenced retention. Positive provider-patient interactions fostered trust and enhanced the overall care experience, thereby encouraging continued enrollment. Interestingly, informal workers with a poor attitude toward the NHI were 1.97 times less likely to retain their enrollment compared to their counterparts (p -value = 0.004). This finding was comparable with studies done in Ethiopia, which has a similar health insurance scheme (Ashagrie, Biks, & Belew, 2020). Individuals who understand the importance of health insurance and believe in its effective management are likely to have a positive attitude towards it, increasing their retention with NHI (Yusuf et al., 2019). This finding was comparable with studies done in Ethiopia, which has a similar health insurance scheme (Ashagrie et al., 2020). People who have a better understanding of the importance of health insurance and believe in well-managed health insurance might influence their attitude towards health insurance to be positive and more likely to keep retention with NHI (Yusuf et al., 2019).

The domain of accessibility to health facilities and the availability of healthcare services are critical factors associated with the retention of NHI among informal workers. Respondents who perceived that health services were readily available in their areas were 2.43 times more likely to maintain their membership. Questionnaire items under the opportunity domain addressed perceived distance to facilities, ease of getting appointments, and wait times. These responses highlight how physical and logistical access to care reinforces the practical value of health insurance; when services are easier to reach, the insurance is more likely to be used and valued. Supporting literature also confirms that service proximity is a determinant of health service utilization and insurance engagement. Long travel times, high transportation costs, or perceptions of overcrowded or unavailable facilities discourage usage and subsequently affect retention. Similarly, a study conducted in Ethiopia revealed that proximity to health facilities and shorter travel times were positively correlated with the utilization of services among informal workers (Deresse, Eshete, Mulatu, & Dessalegn, 2023). Additionally, research from Northern Ghana identified several barriers to healthcare access for informal workers, including the lengthy distances to health facilities and the associated travel costs (Domapielle, Dassah, Dordaa, Cheabu, & Sulemana, 2023). Furthermore, a systematic review examining the impact of NHI in low- and middle-income countries emphasized that the availability and accessibility of healthcare services are essential determinants of insurance uptake and retention, particularly among the poor and those in the informal sector. The review noted that without accessible healthcare facilities, the perceived value of health insurance diminishes, leading to lower retention rates. (Acharya et al., 2012; Ayanore et al., 2019; Ogundeji, Akomolafe, Ohiri, & Butawa, 2019).

The domain of ability found that individuals who understand the benefits and limitations of NHI are significantly more likely to maintain their NHI membership. This finding is consistent with previous research, which highlights the importance of knowledge in the retention of health insurance among informal sector workers. Individuals who demonstrated a strong understanding of knowledge-based inquiries, such as their awareness of coverage entitlements, familiarity with the claims process, and comprehension of co-payment structures, were found to be 1.74 times more likely to maintain their health insurance membership. This significant correlation underscores the critical role that health insurance literacy plays in empowering people. A study conducted in Lao PDR found that outpatients had a low overall understanding of the benefits, coverage limits, and co-payment policies of the NHI scheme. This limited awareness may prevent individuals from accessing necessary health services and could lead to additional informal fees. The study recommended implementing comprehensive health education and promotion programs to improve knowledge about the NHI. Such initiatives could enhance retention and utilization rates (Chaleunvong et al., 2020). Similarly, research in Indonesia assessed determinants of compliance with NHI contribution payments among informal workers. The study revealed that individuals with poor knowledge of the NHI were less likely to comply with contribution payments. It concluded that improving knowledge about the NHI through extensive education could encourage compliance and retention among informal workers (Trisnasari et al., 2023). Furthermore, an educational intervention study in urban Bangladesh demonstrated that providing information about health insurance mechanisms and benefits significantly increased the willingness to pay among informal sector workers. This suggests that targeted educational programs can enhance understanding and potentially improve retention rates in health insurance schemes (Khan & Ahmed, 2013; Rahman, Gasbarro, & Alam, 2022; Wang, Torres, & Travis, 2018).

Conclusion

This study identifies critical factors influencing NHI retention among NSSF members in Phnom Penh, Cambodia. Education, income, employment sector, service quality perception, and accessibility were found to be key determinants. These findings highlight the need for targeted interventions to enhance retention rates, ensuring the long-term sustainability of the NSSF program and contributing to Cambodia's progress toward UHC. While this study provides valuable insights, it has some limitations. The cross-sectional design limits causal inferences, and self-reported data may be subject to recall bias. Future research could employ longitudinal studies to assess retention trends over time and explore additional factors influencing insurance sustainability. Moreover, qualitative studies could provide deeper insights into the experiences and perceptions of NSSF members regarding insurance retention.

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Declaration of Interest Statement

The authors declare that they have no conflict of interest.

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