Social Health Insurance Schemes like other forms of health insurance have some risks, both health and financial risks. These risks are ultimately reduced to financial risks. Health insurance faces financial risks when they assume liability for the difference between premium revenues and their estimates of future claims cost for a group. The health insurance risk is the difference between the revenues estimated to be produced by an experience-rated premium set well before a plan year begins and the reasonable range of estimates of the claims costs that might be incurred throughout the year of the business. This risk is a function of how precisely an actuary can estimate future costs. The risk increases as the imprecision or uncertainty of estimates of future claims costs increases. Changing National Health Service prices, volume trends, unexplained changes in claims cost, lack of complete or current data on cost experience, new coverage or insurance experience, and increasing adverse risk selection are some of the factors that may affect prediction of future costs.

The NHIS became operational in June 2005 with a fixed premium of about seven hundred and thirty one naira.
In the NHIS the premium is fixed and same for everybody, irrespective of the health risks, locality or volume of enrolled people. This implies that there are no risk equalisation mechanisms and no other payment is made apart from the stipulated ones. Risk equalisation measures are required in social health insurance to reduce disparities in exposure to risk of funds or to ensure that poor funds can provide similar set of health services as rich funds. The operators of the scheme cannot exclude a contributor on basis of high risk, locality or low volume of enrollment. Non equalisation of risks in the NHIS programme may predispose organisations with a low pool to deliver poor set of services and a high administrative cost compared to those with higher pools. This means the enrolled population would not have access to qualitative care as stipulated in the objectives setting up the NHIS. Also organisations with smaller pools in the absence of risk equalisation may not be able to perform the function of cost control through utilisation management. This too negates one of the objectives for the NHIS which is to control the cost of medical services. Health Maintenance Organisations (HMOs) with inadequate risk-management techniques are likely not to perform their functions as stipulated in the act that established the scheme and also may suffer huge financial losses which may lead to the collapse of the scheme. It is known that financial risk is the greatest risk of health insurance that could lead to collapse of the industry. One of the characteristics of a Health Maintenance Organisations is to assume some of the financial risks or gain of a health insurance scheme.

This study aimed to assess the risk-management techniques deployed by registered HMOs who are the main operators of the NHIS in Nigeria by determining registered HMOs’ profile; identifying the types of risks inherent in the NHIS; and estimating the utilisation rate of risk-management strategies in the operation of the scheme in Nigeria by HMOs.

MATERIALS AND METHODS

This was a descriptive study of a cross-section of HMOs registered in Nigeria and participating in the NHIS in Nigeria on Risk Management among HMOs.

The sample size of 30 was obtained using the hypergeometric population formula for small population size. This implied that all viable, functioning HMOs were included in the study except the one used for pre-testing the questionnaire, totaling 33 HMOs were sampled because of the very small population.

The three sectioned, pre-tested, self-administered questionnaire sought to answer questions pertaining to background and profile of HMOs, the risk factors in the NHIS and risk management. Field workers were trained for 2 hours daily over a period of 2 days.

The study done in May 2013 over a 4-week period involved all HMOs registered by and participating in the NHIS. The study tool was delivered directly to the Chief Executive Officer (and in his/her absence) to the next top management staff involved in operations of the HMO to answer by a local trained field officer.

Information obtained from the questionnaire was entered into a personal computer and was analyzed with SPSS version 17. Presentations of the categorical variables were done using figures and tables. The test of significance for associations using Chi-square, P-value was set at 0.05 for level of significance.

RESULTS

Out of the 33 HMOs that received the questionnaires only 21 responded giving a response rate of 63.64%. Majority of the respondents 57.1% (12) had 5 to 10-years working experience as HMOs, while 38.1% (8) and 4.8% (1) had 15-20 years and 25-30 years, respectively. Up to 57.2% (12) of the respondents are third generation HMOs with less than 6-years experience in NHIS while 19.0% (4) and 23.8% (5) are second and first-generation HMOs with 6 and 7-years experience in NHIS, respectively. More than half, 52.4% (11) of the respondents had weak membership base, 14.3% (3) had extremely strong membership base, 9.5% (2) were fairly strong, strong and 4.8% were very strong. More than half (57.1%) and 42.9% of the respondents serviced 100-400 and 1400-1700 providers, respectively.

More than half (52.4%) received a premium less than 30 million naira per month, 19% received 30 to 40 million, 9.5% had 40 to 50 million and 60 to 70 million while 4.8% had 70 to 80 million, 90 to 100 million and more than 100-million naira monthly. MDG Maternal and child health had the highest participation with 71.4% (15) while community-based insurance and Student’s T ship had the lowest with 9.5% (2) and formal sector programme had 42.9% (9) [Table 1].

Concerning knowledge of types of risks inherent in NHIS, all the respondents cited changing National Health Services, fraudulent providers billing, increased...
utilisation rate, volume trends and unexplained changes in claims cost as environmental risks, none of the respondents were able to identify new coverage or health insurance experience as an environmental risk and only one (1) identified increased adverse selection. Almost all 20 (95.2%) cited lack of complete or current data on cost experience as financial risk, none cited financial reserve as a risk. In terms of operational risk, 15 (71.4%), 13 (61%), 12 (57.1%) cited inadequate claims management, poor operations management, inadequate human resources as operational risk management, respectively, and all (100%) cited poor provider knowledge of operations of the scheme and lack of reinsurance as operational risk.

Lack of complete or current data on claims, lack of consideration of information on utilisation were cited by 20 (92.2%), 18 (85.7%), respectively, and all knew inadequate underwriting as pricing risk. However, only 5 (23.8%) and none knew that internal fraud and litigation from providers and members were reputational risk, respectively [Table 2].

All the respondents attested to implementing risk-management strategies and statutory risk-management strategies prescribed by NHIS were strictly adhered to. None of the other basic strategy of risk management in social health insurance was implemented by the respondents. This by calculation gives a 52.6% utilisation rate of risk-management strategies and 47.4% non-utilisation of risk-management strategies [Table 3].

Concerning NHIS standard risk-management strategies, as high as 4 (19%) did not meet NHIS standard in human resources in medical unit, 10 (47.6%) in Human

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**Table 1: Profile of HMOs (n = 21)**

| Years of experience as a HMO | Frequency | Percentage (%) |
|------------------------------|-----------|----------------|
| 0 to 5                       | 0         | 0              |
| 5 to 10                      | 12        | 57.1           |
| 10 to 15                     | 0         | 0              |
| 15 to 20                     | 8         | 38.1           |
| 20 to 25                     | 0         | 0              |
| 25 to 30                     | 1         | 4.8            |
| Total                        | 21        | 100.0          |

Duration of participation in NHIS in years

| No of Years                  | Frequency | Percentage (%) |
|------------------------------|-----------|----------------|
| 1 to 5 (Third generation HMO)| 12        | 57.2           |
| 6 (Second generation HMO)    | 4         | 19.0           |
| 7 (First generation HMO)     | 5         | 23.8           |
| Total                        | 21        | 100.0          |

Membership Base

| No of lives                  | Frequency | Percentage (%) |
|------------------------------|-----------|----------------|
| Less than 30,000             | 12        | 57.14          |
| 30,000 to 50,000             | 2         | 9.52           |
| 50,000 to 70,000             | 2         | 9.52           |
| Above 70,000                 | 5         | 23.81          |
| Total                        | 21        | 100.0          |

Average premium per month in millions of naira

| Less than 30                 | 12        | 57.14          |
| 30 to 49                     | 4         | 19.04          |
| 50 to 69                     | 2         | 9.52           |
| 70 and above                 | 3         | 14.26          |
| Total                        | 21        | 100.0          |

Types of NHIS Programmes

|                  | Frequency | Percentage (%) |
|------------------|-----------|----------------|
| Formal Sector Social Health Insurance | 9 | 42.9 |
| MDG Maternal and child Health | 15 | 71.4 |
| Community Based Health Insurance | 2 | 9.5 |
| Voluntary Contributor Programme (VCSHIP) | 3 | 14.3 |
| Student T ship | 2 | 9.5 |
| Total           | 21        | 100.0          |

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**Table 2: Knowledge of HMO representatives of types of risks in the National Health Insurance scheme (n = 21)**

| Types of risks in NHIS | Frequency | Percentage |
|------------------------|-----------|------------|
| Environmental Risk     |           |            |
| New coverage or Health insurance experience | 0 | 0.0 |
| Changing National Health Services | 21 | 100 |
| Fraudulent Provider billing | 21 | 100 |
| Increased utilisation rate | 21 | 100 |
| Regulatory activities | 18 | 85.7 |
| Increased adverse selection | 1 | 4.8 |
| Volume trends | 21 | 100 |
| Unexplained changes in claims cost | 21 | 100 |
| Financial Risk         |           |            |
| Lack of complete or current data on cost experience | 20 | 95.2 |
| Reserve | 0 | 0.0 |
| Ability to fulfil financial obligations (liquidity) | 9 | 42.9 |
| Operational Risks      |           |            |
| Poor operations management | 13 | 61.9 |
| Inadequate claims management | 15 | 71.4 |
| Inadequate human resources | 12 | 57.1 |
| Inadequate technology | 11 | 52.4 |
| Poor provider knowledge of operations of the scheme | 21 | 100 |
| Internal fraud | 5 | 23.8 |
| Lack of internal control | 9 | 42.9 |
| Lack of reinsurance | 21 | 100 |
| Pricing Risk           |           |            |
| Lack of complete or current data on claims cost | 20 | 92.2 |
| Lack of consideration of information on utilisation trend | 18 | 85.7 |
| Inadequate underwriting (lack of qualified underwriters) | 21 | 100 |
| Reputational Risk      |           |            |
| Litigation from providers and members | 0 | 0.0 |
| Internal fraud | 5 | 23.8 |
Resource/Administration (HR/Admin), 1 (4.8%) in finance, 20 (95.2%) in information and communication technology (ICT), 21 (100%) in underwriting. Only 6 (28.6%) and 2 (9.5%) were excellent with NHIS human resources standard in the medical and finance units, respectively. The finance unit has most satisfactory human resources with 20 (95.2%) of respondents meeting the NHIS standard and underwriting had the worst with none of the respondents meeting the standard. The NHIS standards and ratings were stated in the methodology [Table 4].

Concerning geopolitical spread, four-fifth, 85.72% had good branch network and 4.8%) very good branch network. Only 9.52% did not meet the NHIS Standard of a branch in each geopolitical zone while 90.8% met it. As pertains information and communication technology, about one third of respondents, 7 (33.3%) had inadequate computer systems, 3 (14.3%) fair number of computers, 2 (9.5%) good numbers and very good numbers, respectively; while 7 (33.3%) had excellent number of computer systems All the respondents (100%) received utilisation feedback but only 3 (14.3%) analysed their data. All the respondents deploy 5% of premium for fee-for-service as reserve as a risk-management strategy yet all had 5% of premium for claims payment which could be attributed to the fact that 5% of premium of fee for service is a mandatory reserve fee per guideline of the NHIS

There is a significant association between duration of participation in the NHIS programme; enrollee base; average premium and ability to fulfill financial obligations in the form of administrative expense [Table 5].

| Variable | Frequency | Percentage |
|----------|-----------|------------|
| Respondents that implement risk management | Implement risk management in health insurance | 21 | 100.0 |
| Systems of risk management implemented in respondents HMO | Co payment | 21 | 100.0 |
| | Capitation payment to providers | 21 | 100.0 |
| | Reinsurance | 0 | 0.0 |
| | Reserve from premium | 21 | 100.0 |
| Risk adjustment with: | Age | 0 | 0.0 |
| | Sex | 0 | 0.0 |
| | Occupation | 0 | 0.0 |
| | Residence | 0 | 0.0 |
| | Utilisation rate | 0 | 0.0 |
| | Medical history | 0 | 0.0 |
| | Authorisation for care except primary care | 21 | 100.0 |
| | Verification of claims before payment | 21 | 100.0 |
| | Visitation of providers for verification of service | 21 | 100.0 |
| | Provider education on operations of the scheme | 21 | 100.0 |
| | Establishment of internal control | 21 | 100.0 |
| | Exclusions of treatment of certain diseases | 21 | 100.0 |
| | Exclusions based on age | 21 | 100.0 |
| | Exclusions based on maximum exposure limits | 0 | 0.0 |
| | Renewable contracts in which the insurer can decline | 0 | 0.0 |
| | None | 0 | 0.0 |
| | Total score from respondents | 1000 |
| | Total expected score | 1900 |
| | Percentage utilisation | 52.6 (Good) |

There is a significant association between duration of participation in the NHIS programme; enrollee base; average premium and ability to fulfill financial obligations in the form of administrative expense with P-value less than 0.05. There was no significant association with years of experience as an HMO and number of branches [Table 6].

| Table 4: Human Resources (n = 21) |
|-----------------------------------|
| Human resources status in recommended departments in HMOs |
| No of staff with PG | Medical | HR/Admin | Finance | ICT | Underwriting |
|---------------------|--------|---------|--------|-----|-------------|
| 0                   | 4 (19) | 10 (47.6) | 1 (4.8) | 20 (95.2) | 21 (100) |
| 1                   | 4 (19) | 7 (33.3) | 6 (28.6) | 1 (4.8) | 0 (0.0) |
| 2                   | 2 (9.5) | 2 (9.5) | 2 (9.5) | 0 (0.0) | 0 (0.0) |
| 3                   | 5 (23.8) | 2 (9.5) | 10 (47.6) | 0 (0.0) | 0 (0.0) |
| 4*                  | 6 (28.6) | 0 (0.0) | 2 (9.5) | 0 (0.0) | 0 (0.0) |
| Total               | 21 (100) | 21 (100) | 21 (100) | 21 (100) | 21 (100) |

*HR/Admin means Human Resources and Administration; ICT means Information and Communication Technology; PG means post-graduate degree or certification

**DISCUSSION**

The study identified knowledge of key factors that may increase risk in the NHIS among respondents. These factors are classified into different types of risks. The entire respondents (100%) identified volume trend, unexplained changes in claims cost, changing National Health Service, fraudulent provider billing, increased utilisation rate, high administrative cost and poor provider knowledge of the operations of the scheme. These identified risks could be categorised according to the Mapping of Health Company Risk, Society of Actuaries, Risk Management Task Force, Health Risk Management Group (2003) into environmental risks, financial risks, operational risks and pricing risks.9 Inspite of the fact that all the HMOs in this received utilisation feedback only 14.3% analyzed it. This perhaps may be responsible for the non-availability of complete data on cost experience, and this agrees with the findings in using the framework for assessing social health insurance in Africa, in order to

assess the NHIS that the benefit packages do not appear to have been subjected to analysis of cost-effectiveness or explicit equity criteria.11

In this study all the respondents failed to identify reserve as a risk-management strategy yet all had 5% of premium of fee for service kept aside as reserve. This could be attributed to the fact that 5% of premium of fee for service is a mandatory reserve fee per guideline of the
NHIS. Surprisingly only five of the respondents (23.8%) identified internal fraud as one of the types of risks in health insurance in a country where fraud is widespread. Abel Smith in reiterated that the success of the scheme is dependent on a country’s administrative capability to efficiently operate the scheme, without corruption, keeping administrative cost as low as possible; and Banerji in that simplification of procedures, especially in collection of contributions, guarantees a steady flow in the process of organisation and administration of the system. This study showed that more than half of the respondents (57.1%) had liquidity problems as demonstrated by their inability to meet their financial obligations of administrative cost [Table 5].In contradistinction, the American Academy of Actuaries had lower (25%) health liquidity, where out of 356 health insurance companies in America 90 experienced liquidity problems. This could be explained by the fact that some of the American health insurance companies may be better staffed in terms of adequacy and appropriateness, skill and competencies, better capitalised and have more efficient and effective risk-management strategies in place.

Of all the five key operational departments: medical, human resources, finances, information technology and underwriting, the study revealed that the Underwriting Unit was the worst staffed with no qualified underwriter. Table 5] Less than a quarter (19%) of HMOs did not have adequate medical staff, 47.6% did not have adequate Administrative and Human resources staff, 4.8% did not have adequate finance staff, and 95.2% did not have adequate information and communication technology staff. Up to 33.3% of HMOs had poor or inadequate information and communication technology systems. This obviously mirrors the human resources in health care system trend in sub-Saharan Africa, where lack of adequacy between expected skills from the

| Variable | Rating  | Frequency | Percentage |
|----------|---------|-----------|------------|
| A branch in each geopolitical zone | Good | 19 | 90.5 |
| No | Poor | 2 | 9.5 |
| Branch Network of HMOs | Poor | 2 | 9.52 |
| 6-10 Good | 18 | 85.72 |
| 11-15 Very good | 1 | 4.76 |
| >15 Excellent | 1 | 4.76 |
| Total | 21 | 100 |
| Number of Computers per HMO | Poor | 7 | 33.33 |
| 30 Fair | 3 | 14.29 |
| 30-40 Good | 2 | 9.52 |
| 40-50 Very good | 2 | 9.52 |
| >50 Excellent | 7 | 33.33 |

| Variable | Rating  | Frequency | Percentage |
|----------|---------|-----------|------------|
| Use of software in operations | Yes | 21 | 100 |
| Received Utilisation Feedback | Yes | 21 | 100 |
| Analysed Utilisation Feedback | Yes | 3 | 14.3 |
| No | 18 | 85.7 |
| Total | 21 | 100 |
| Deployment of 5% Premium as Reserve | Yes | 21 | 100 |
| Ability to fulfil financial obligation | Yes | 9 | 42.9 |
| No | 12 | 57.1 |
| Type of obligation | Administrative | 21 | 100 |

| Variable | Ability to fulfil financial obligations | Fishers’ exact DF | P-value |
|----------|-----------------------------------------|------------------|---------|
| Year of Experience of HMO | Yes | No | Total |
| 0 to 10 | 5 | 7 | 11 | 0.217 |
| 10 to 20 | 6 | 2 | 8 | 0.027* |
| 20 to 30 | 1 | 0 | 1 | |
| Total | 12 | 9 | 21 | |
| Number of enrollees | Less than 30,000 (Weak) | 3 | 8 | 11 | 10.049 | 5 | 0.00077 |
| 30,000 m to 50,000 (Fairly strong) | 1 | 1 | 2 | |
| 50,000 to 70,000 (Strong) | 2 | 0 | 2 | |
| 70,000 to 90,000 (Very Strong) | 1 | 0 | 1 | |
| 90,000 to 110,000 (Extremely strong) | 2 | 0 | 2 | |
| More than 110,000 (Extremely strong) | 3 | 0 | 3 | |
| Duration of NHIS participation (years) | 1 to 5 | 4 | 8 | 12 | 0.027* |
| 6 | 3 | 1 | 4 | |
| 7 | 5 | 0 | 5 | |
| Total | 12 | 9 | 21 | |
| No of branches | <6 | 0 | 2 | 2 | 0.16 |
| 6-10 | 11 | 7 | 18 | |
| 11-15 | 1 | 0 | 1 | |
| >15 | 0 | 0 | 0 | |
| Total | 12 | 9 | 21 | |
| Less than 30 | 2 | 8 | 10 | 10.505 | 5 | 0.00056 |
| 30 to 40 | 3 | 1 | 4 | |
| 40 to 50 | 2 | 0 | 2 | |
| 50 to 60 | 0 | 0 | 0 | |
| 60 to 70 | 2 | 0 | 2 | |
| 70 to 80 | 1 | 0 | 1 | |
| 80 to 90 | 0 | 0 | 0 | |
| 90 to 100 | 1 | 0 | 1 | |
| More than 100 | 1 | 0 | 1 | |
| Total | 12 | 9 | 21 | |

*Degree of freedom DF
professors and health care needs expressed by the populations was cited.  

Over half of the respondents (52.4%) had weak enrollee base and a monthly premium of less than 30 million naira. The third generation/weak HMOs, having less than 30,000 lives, receiving less than 30,000,000 naira as monthly premium obviously had been unable to meet their financial obligations compared with the very strong HMOs with lives ranging from 90,000 to more than 110,000 lives and receiving monthly premium of more than 90 million to more than 110 million naira. This is consistent with the economic theory that the more the number the less the unit cost/price cheque. The viability of the scheme to a large extent depends on adequate population coverage. It is a well-known fact that the wider the coverage (larger population) the less the unit cost and more viable the scheme financially. In addition if a health financing system is unevenly fragmented into several funds, devoid of significant reputation risk and poor regulatory framework and legislation its risk protection ability may be reduced. This may be the case with NHIS with its small pool being fragmented into thirty four places in an uneven manner. All the respondents utilised one form of risk management or the other with a utilisation rate of 52.6% out of 19 known risk-management strategies. The 42.4% unutilised risk-management strategies majorly bordered on risk adjustment/equalisation and reinsurance. This corresponds with the findings while using the Carrin and James framework to analyze progress in social health insurance scheme. Risk equalisation is a critical tool in the operation of a competitive health insurance. It is a mechanism used to equalise the risk profiles of health insurers when, through regulation, they are required to accept any applicant (open enrolment) and charge them the same premium, irrespective of their health risk profile (community rating). Although perfect risk equalisation has not yet been achieved in general lessons from other countries point to the designed features involving the expanded range variables in risk equalisation formula, that is the use of prospective rather than retrospective, the frequency of funds transfers and the modality of financial flows. Australia operates a primitive (age based) risk equalisation through the Private Health Insurance Administration Council (the regulator) which administers the Risk Equalisation Trust Fund (the mechanism for operating risk equalisation in private health insurance for the purpose of ensuring that the private health insurance industry operates equitably.

Reinsurance, as a solvency booster and a very vital risk-management strategy was not utilised by any of the HMO even though all the respondents had cited reinsurance as a risk-management strategy. This is because reinsurance (that is insurance bought by insurers) is not in the NHIS policy/guidelines as a risk-management strategy in Nigeria. The benefit of reinsurance is that it improves the solvency of the insurer and covers five domains of financing, capacity building, stabilisation, catastrophic protection, underwriting and managerial assistance. It pools the risk that the individual funds may find too much to bear. Although reinsurance is widely used by the underwriters of health benefits (insured and self-funded plans) its role is little understood by policy makers.

The study showed a strong statistical association between duration of participation in NHIS programme and ability to fulfill financial obligations (\(P = 0.004\)), number of enrollees or membership base and ability to fulfill financial obligations (\(P = 0.0007\)), average premium per month and ability to fulfill financial obligations (\(P = 0.0005\)). These may have implicated negatively on the ability of HMOs in this category (third generation) to perform their responsibilities to the scheme. This ultimately would lead to poor services and loss of the risk protection objective of the scheme, thus confirming the importance of risk equalisation.

CONCLUSIONS

The HMOs operating the NHIS had good knowledge of the risk-management strategies and were fairly well on course in the utilisation of available strategies in the scheme. However, their efforts at managing the risks inherent in the health insurance had been hampered by lack of risk equalisation, lack of reinsurance, low enrollee base and poor monthly premium.

There is, therefore, an urgent need to review the structure of the collaboration between the NHIS and the HMO in the areas identified. This can be achieved by introducing risk adjustment into the scheme, accelerating the legislative process of making the scheme compulsory so as to increase the enrollee base and making reinsurance a pre-condition for participation of any HMO in the scheme.

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