Knowledge, attitudes, and quality of life of caregivers toward asthma in their children: A Nigerian perspective

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ABSTRACT

Introduction: The burden of uncontrolled asthma is high and caregivers can offer support in the management of asthma. Asthma is one of the most common chronic diseases in children. The objective of this study was to assess the knowledge, attitudes, and quality of life (QoL) of caregivers toward asthma in their children.

Methods: This cross-sectional study was conducted in the Paediatric Respiratory Unit of the University of Nigeria Teaching Hospital, Ituku-Ozalla, Enugu State (July 2017-September 2017). We utilized a 46-item questionnaire comprising knowledge and attitude domains and the 13-item Pediatric Asthma Caregiver’s QoL Questionnaire (PACQLQ). Data were analyzed using the IBM SPSS Version 25.0. Statistical significance was set at \( p < 0.05 \).

Results: Fifty-one caregivers participated in the study. More than half (n = 36, 70.6%) of the caregivers were 40 years old and above, female (n = 37, 72.5%), graduates from higher institutions (n = 33, 64.7%), and self-employed (n = 27, 52.9%). About a quarter (n = 13, 25.5%) had a family history of asthma and a similar proportion (n = 14, 27.5%) knew the three main symptoms of asthma.

Conclusion: Less than half (n = 24, 47.1%) of the caregivers had good asthma knowledge. Dust (n = 35, 68.6%) and smoke (n = 31, 60.8%) were identified as the most common asthma triggers in their children. The majority of the caregivers (n = 41, 80.3%) agreed that most people can have well-controlled asthma without seeing a doctor regularly. Overall, less than half of the caregivers (n = 24, 47.1%) showed positive attitudes toward their children’s asthma. The overall score for the PACQLQ was 3.91 (0.98) which implied a poor QoL. The caregivers had both impaired activity and emotional function from managing asthma in their children. More female caregivers had better knowledge about asthma than their male counterparts (t = −3.178; df = 49; \( p = 0.003 \)). Less than half of the caregivers had good asthma knowledge and positive attitudes toward asthma in their children. They had an impaired QoL from managing asthma in their children.

Keywords: Asthma; attitudes; children; knowledge

INTRODUCTION

Asthma is a recognized public health problem that affects patients and their caregivers (1,2). Poorly controlled asthma patients have reduced quality of life (QoL) and escalated health-care costs (3-5). Childhood diseases affect not only the child but also the caregivers since children are part of the
dependent population (6). The management of asthma in pediatrics requires caregiver competencies such as the identification and avoidance of triggers, implementation of environmental control protocols at home, recognition of symptoms, and administration of medications (7). Caregivers experience the challenges of identifying and managing allergies, being hypervigilant, differentiating asthma symptoms from other health concerns, and knowing when to seek emergency care (8). These could make asthma caregiving stressful. The knowledge of the disease state, cultural beliefs, attitudes toward chronic illnesses, and psychological stressors can impact asthma control (9,10).

In Nigeria, the poor standard of living makes the management of asthma difficult (11). The burden of managing asthma can affect caregiver’s QoL, especially those with a poor economic background (12). Depressive symptoms have been reported among some caregivers who manage pediatric asthma (13). Research works have been conducted among parents and caregivers of asthma patients, but there is a paucity of data from studies conducted in Nigeria. Hence, the general objective of this study was to assess the knowledge, attitudes, and QoL of caregivers toward asthma in their children.

METHODS

Study design and sample population
This was a cross-sectional survey conducted at the Paediatric Respiratory Unit of the University of Nigeria Teaching Hospital (UNTH), Ituku-Ozalla, Enugu State. The respiratory clinic holds every Tuesday. The eligibility criteria comprised all caregivers of pediatric asthma patients (≤18 years old) who were not newly diagnosed and visited the Respiratory Clinic between July 2017 and September 2017. Written and verbal consent were obtained from those willing and able to participate.

Data collection
The study instrument had three major domains. The knowledge domain was adapted from the 31-item Newcastle Asthma Knowledge Questionnaire developed and validated by Fitzclarence and Henry with questions on asthma symptoms, trigger factors, basic physiology, types of medication and their use, and important general message about asthma (14,15). The open-ended questions of the questionnaire were scored such that Question 1 was rated correctly only when all the three main symptoms of asthma were enumerated. Questions 9, 10, 20, and 22 were rated as correct when the respondent provided at least two of the answers stipulated as correct answers. The total knowledge score was the sum of the individual knowledge items scored as correct = 1 or incorrect = 0. The total knowledge score was categorized with the cutoff point taken as the median score such that those with scores above the median, classified as having good knowledge with below the median, classified as poor knowledge.

The attitudes domain was adapted from the 15-item self-administered questionnaire by Gibson et al. (16). The total attitude score was obtained by the sum of the individual attitude items. Items that depicted positive attitudes (before or after rephrase) were given a score of 1 for those who had any element of an agreement while those who had an element of disagreement were scored 0. The total attitude score was categorized with the cutoff point as the median score such that those with scores above the median were classified as having positive attitudes toward their children’s asthma while those below the median score had negative attitudes.

A pilot study was conducted with five caregivers of pediatric asthma patients to ensure the suitability of the instrument for the local context. It provided information about the average time to fill the questionnaire as well as possible questions the respondents might want to ask. These caregivers did not participate in the main study. Six clinical pharmacists of the Department of Clinical Pharmacy and Pharmacy Management, University of Nigeria Nsukka, scrutinized the items of the questionnaire and made suggestions which improved the knowledge and attitude domains.

The QoL domain utilized the Pediatric Asthma Caregivers’ QoL Questionnaire (PACQLQ) to find out how asthma interfered with the normal daily activities of caregivers (17).

Data analysis
Data were analyzed using the IBM SPSS Version 25.0. Descriptive statistics, such as mean ± standard
deviation, were used to summarize data. Inferential statistics utilized the independent t-test and analysis of variance where applicable, with statistical significance set at $p < 0.05$.

**Ethical consideration**

Ethical clearance to conduct the study was obtained from the Health Research and Ethics Board of UNTH, Ituku-Ozalla, Enugu State. The study participants were informed of the general objective of the study and confidentiality was maintained throughout. Written consent was obtained from those that agreed to participate. Participation was voluntary and the caregivers were informed that they could withdraw if they deemed it necessary. All the caregivers that were eligible to participate gave their consent. None withdrew from the study.

**RESULTS**

A total of 51 questionnaires were completed by the caregivers of the pediatric asthma patients of UNTH.

More than half ($n = 36, 70.6\%$) of the caregivers were 40 years old and above, female ($n = 37, 72.5\%$), graduates from higher institutions ($n = 33, 64.7\%$), and self-employed ($n = 27, 52.9\%$). About a quarter ($n = 13, 25.5\%$) had family history of asthma. Majority of the asthmatic children of the caregivers were between 6 and 14 years ($n = 39, 76.6\%$). These children were mostly first diagnosed for asthma between 3 and 8 years ($n = 25, 49.0\%$). Close to 69% of the caregivers earned less than ₦100,000 monthly ($1 = ₦356$, as of the time study.

Of all the caregivers, about a quarter ($n = 14, 27.5\%$) knew the three main symptoms of asthma. A majority ($n = 46, 90.2\%$) knew that an asthma attack may be due to tightening in the wall of the air passages in the lungs, Table 1A and B. After the categorization of the total knowledge score with a median score of 14, less than half ($n = 24, 47.1\%$) of the caregivers had good knowledge of asthma.

More than half of the caregivers identified dust ($n = 35, 68.6\%$) and smoke ($n = 31, 60.8\%$) as the most common asthma triggers in their children (Figure 1).

The majority of the caregivers ($n = 41, 80.3\%$) agreed that most people can have well-controlled asthma without seeing a doctor regularly. Less

| TABLE 1A. Knowledge of asthma (I) |
|-----------------------------------|
| Questions (correct answers)       | n (%) |
| 1. Three main symptoms of asthma (cough, breathlessness, and wheezing) | 14 (27.5) |
| 2. More than one in 10 children have asthma in their childhood (No) | 25 (49.0) |
| 3. Children with asthma have abnormal air passages in their lungs (Yes) | 31 (60.8) |
| 4. If one child has asthma then all his/her siblings are almost certain to have asthma as well (No) | 37 (72.5) |
| 5. Most children with asthma have an increase in mucus when they drink cow’s milk (No) | 17 (33.3) |
| 6. During an attack of asthma, the wheeze may be due to tightening in the wall of the air passages in the lungs (Yes) | 46 (90.2) |
| 7. During an attack of asthma, the wheeze may be due to swelling in the lining of the passages in the lungs (Yes) | 30 (58.8) |
| 8. Asthma damages the heart (Yes) | 26 (50.7) |
| 9. Two asthma treatments (medicines), which are taken every day regularly to prevent an attack from occurring (salmeterol/fluticasone Diskus®/Evohaler®, Montelukast, budesonide/formoterol Symbicort®) | 3 (5.9) |
| 10. Three asthma treatments (medicines), which are useful during an asthma attack (Ventolin®, ipratropium bromide, aminophylline slow IV) | 1 (2.0) |
| 11. Antibiotics are an important part of treatment for most children with asthma (No) | 11 (21.6) |
| 12. Most children with asthma should not eat dairy products (No) | 29 (56.9) |
| 13. Allergy injection cures asthma (No) | 17 (33.3) |
| 14. If a person dies from an asthma attack, this usually means that the final attack must have begun so quickly that there was no time to start any treatment (No) | 11 (21.6) |
| 15. People with asthma usually have “nervous problem” (Yes) | 29 (56.9) |
| 16. Asthma is infectious (i.e., you can catch it from other persons) (No) | 37 (72.5) |
| 17. Inhaled medications for asthma (e.g., Ventolin inhaler®) have fewer side effects than tablets (Yes) | 28 (54.9) |
than half of the caregivers (n = 20, 39.2%) agreed that someone with asthma should not use an inhaler in class (Table 2). After categorization, less than half of the caregivers (n = 24, 47.1%) showed positive attitudes toward their children's asthma.

More than half of the caregivers (n = 37, 68.6%) felt helpless in many instances that their children...
experienced asthma symptoms. About three-quarters (n = 38, 74.4%) of the caregivers were noticeably worried about their children's performance of normal daily activities (Table 3).

The overall score for the PACQLQ was 3.91 ± 0.98 which implied a poor QoL. The caregivers had both impaired activity (3.95 ± 1.07) and emotional function (3.89 ± 1.08) from managing asthma in their children.

More female caregivers had better knowledge about asthma than their male counterparts (t = −3.178; df = 49; p = 0.003) (Table 4A). Those who earned
DISCUSSION

Most of the caregivers in our study were between the ages of 30 and 49 years and female. The Organization for Economic Cooperation and Development less than ₦20,000 monthly had significantly better attitudes toward asthma than those who earned above ₦100,000 monthly ($F = 4.267; \ p = 0.005$) (Table 4B).

### TABLE 3. Pediatric Asthma Caregiver’s quality of life

| Question                                                                 | All of the time | Most of the time | Quite often | Some of the time | Once in a while | Hardly any of the time | None of the time | Mean (SD)  |
|---------------------------------------------------------------------------|-----------------|------------------|-------------|------------------|-----------------|------------------------|------------------|------------|
| 1. Did you feel helpless or frightened when your child experienced cough, wheeze, or breathlessness? | 4 (7.8)         | 31 (60.8)        | 2 (3.9)     | 7 (13.7)         | 4 (7.8)         | 1 (2.0)                | 2 (3.9)         | 2.75 (1.47) |
| 2. Did your family need to change plans because of your child’s asthma? | 3 (5.9)         | 3 (5.9)          | 4 (7.8)     | 5 (9.8)          | 31 (60.8)       | 1 (2.0)                | 4 (7.8)         | 4.51 (1.42) |
| 3. Did you feel frustrated or impatient because your child was irritable due to asthma? | 2 (3.9)         | 6 (11.8)         | 4 (7.8)     | 5 (9.8)          | 4 (7.8)         | 25 (49.0)              | 5 (9.8)         | 4.92 (1.74) |
| 4. Did your child’s asthma interfere with your job or work around the house? | 7 (13.7)        | 1 (2.0)          | 27 (52.9)   | 4 (7.8)          | 5 (9.8)         | 4 (7.8)                | 3 (5.9)         | 3.45 (1.59) |
| 5. Did you feel upset because of your child’s cough, wheeze, or breathlessness? | 5 (9.8)         | 4 (7.8)          | 4 (7.8)     | 6 (11.8)         | 27 (52.9)       | 2 (3.9)                | 3 (5.9)         | 4.25 (1.57) |
| 6. Did you have sleepless nights because of your child’s asthma? | 3 (5.9)         | 4 (7.8)          | 6 (11.8)    | 30 (58.8)        | 2 (3.9)         | 1 (2.0)                | 5 (9.8)         | 3.92 (1.41) |
| 7. Were you bothered because your child’s asthma interfered with family relationships? | 2 (3.9)         | 4 (7.8)          | 4 (7.8)     | 5 (9.8)          | 28 (54.9)       | 2 (3.9)                | 6 (11.8)        | 4.63 (1.47) |
| 8. Were you awakened during the night because of your child’s asthma? | 2 (3.9)         | 7 (13.7)         | 3 (5.9)     | 30 (58.8)        | 4 (7.8)         | 0 (0.0)                | 5 (9.8)         | 3.92 (1.40) |
| 9. Did you feel angry that your child has asthma? | 3 (5.9)         | 5 (9.8)          | 3 (5.9)     | 4 (7.8)          | 6 (11.8)        | 2 (3.9)                | 28 (54.9)       | 5.41 (2.07) |

During the past week, how worried or concerned were you:

| VVW/C | VW/C | FW/C | SW/C | ALW/C | HW/C | NW/C | Mean (SD) |
|-------|------|------|------|-------|------|------|-----------|
| 10. About your child’s performance of normal daily activities? | 2 (3.9) | 32 (62.7) | 4 (7.8) | 4 (7.8) | 5 (9.8) | 2 (3.9) | 2 (3.9) | 2.84 (1.50) |
| 11. About your child’s asthma medications and side effects? | 3 (5.9) | 5 (9.8) | 7 (13.7) | 5 (9.8) | 30 (58.8) | 1 (2.0) | 0 (0.0) | 4.12 (1.32) |
| 12. About being overprotective of your child? | 6 (11.8) | 32 (62.7) | 2 (3.9) | 1 (2.0) | 4 (7.8) | 3 (7.8) | 3 (5.9) | 2.73 (1.70) |
| 13. About your child being able to lead a normal life? | 6 (11.8) | 5 (9.8) | 26 (51.0) | 3 (5.9) | 5 (9.8) | 2 (3.9) | 4 (7.8) | 3.35 (1.60) |

All of the time and VVWC (coded as 1); most of the time and VW/C (coded as 2); quite often and FW/C (coded as 3); some of the time and SW/C (coded as 4); once in a while and ALWC (coded as 5); hardly any of the time and HW/C (coded as 1); none of the time and NW/C (coded as 7); SD: Standard deviation. VVWC: Very, very worried/concerned; VW/C: Very worried/concerned; FW/C: Fairly worried/concerned; SW/C: Somewhat worried/concerned; ALWC: A little worried/concerned; HW/C: Hardly worried/concerned; NW/C: Not worried/concerned
### TABLE 4A. Mean difference analysis of variables (I)

| Variables                          | n   | Mean knowledge score (SD) | 95% CI       | p-value | Mean attitude score (SD) | 95% CI       | p-value | MeanAQL | 95% CI | p-value | Mean activity score (SD) | 95% CI       | p-value | Mean emotional function score (SD) | 95% CI | p-value |
|-----------------------------------|-----|---------------------------|--------------|---------|--------------------------|--------------|---------|---------|--------|---------|-------------------------------|--------------|---------|-----------------------------------|--------|---------|
| Gender                            |     |                           |              |         |                          |              |         |         |        |         |                               |              |         |                                   |        |         |
| Male                              | 14  | 11.36 (4.50)              | -6.74-1.52   | 0.003*  | 68.43 (10.80)            | -0.78-11.31 | 0.086   | 4.14 (0.36) | 0.29-0.94 | 0.13 (0.54)  | -0.44-0.91               | 4.15 (0.41)  | 0.479   | -0.32-1.04                       |        |         |
| Female                            | 37  | 15.49 (4.0)               | -0.56-5.40   | 0.133   | 63.16 (9.11)             | -0.47         | 0.206   | 4.13 (0.36) | 0.29-0.94 | 4.13 (0.54)  | -0.32-1.16               | 3.79 (1.23)  | 0.477   | 0.178                             |        |         |
| Family history of asthma           |     |                           |              |         |                          |              |         |         |        |         |                               |              |         |                                   |        |         |
| Yes                               | 13  | 16.15 (4.47)              | -0.44-5.27   | 0.007   | 61.08 (8.83)             | -10.97-1.49 | 0.684   | 4.21 (1.17) | -0.23-1.03 | 4.13 (0.88)  | -0.44-0.94               | 4.24 (1.41)  | 0.477   | -0.22-1.16                       |        |         |
| No                                | 38  | 13.74 (4.40)              | -0.56-5.40   | 0.291   | 65.82 (9.91)             | -0.56-5.40   | 0.291   | 4.24 (1.41) | -0.44-0.94 | 4.24 (1.41)  | -0.22-1.16               | 3.79 (1.23)  | 0.477   | -0.42-1.36                       |        |         |

### TABLE 4B. Mean difference analysis of variables (II)

| Variables                          | n   | Mean knowledge score (SD) | 95% CI       | p-value | Mean attitude score (SD) | 95% CI       | p-value | MeanAQL | 95% CI | p-value | Mean activity score (SD) | 95% CI       | p-value | Mean emotional function score (SD) | 95% CI | p-value |
|-----------------------------------|-----|---------------------------|--------------|---------|--------------------------|--------------|---------|---------|--------|---------|-------------------------------|--------------|---------|-----------------------------------|--------|---------|
| Parent’s age                       |     |                           |              |         |                          |              |         |         |        |         |                               |              |         |                                   |        |         |
| <30                               | 2   | 17.50 (3.54)              | -14.27-19.27 | 0.256   | 55.50 (3.54)             | 23.73-87.27  | 0.653   | 4.00 (0.00) | 4.08-4.08 | 4.0 (0.0)    | 4.0-4.0                       | 4.11 (0.0)  | 0.692   | 4.11-4.11                        |        |         |
| 30-39                             | 13  | 17.31 (3.40)              | 11.25-15.36  | 0.011*  | 69.00 (7.63)             | 64.39-73.61  | 3.79 (1.00) | 3.18-4.39 | 3.75 (1.13) | 3.07-4.43  | 3.8 (1.04)                  | 3.18-4.43   | 0.667   |                                   |        |         |
| 40-49                             | 25  | 14.96 (5.3)               | 12.77-17.15  | 0.133   | 61.32 (9.55)             | 57.38-65.26  | 3.92 (1.01) | 3.48-4.35 | 3.92 (1.05) | 3.49-4.35  | 3.92 (1.21)                | 3.42-4.41   | 0.667   |                                   |        |         |
| 50-59                             | 10  | 12.90 (2.96)              | 10.78-15.02  | 0.206   | 70.20 (8.98)             | 63.78-76.62  | 4.14 (0.88) | 3.51-4.77 | 3.45 (1.19) | 3.50-5.20  | 3.04 (0.91)                | 3.39-4.70   | 0.667   |                                   |        |         |
| >60                               | 1   | 21 (0.00)                 | -             | 0.256   | 52.00 (0.00)             | -            | 2.62 (0.00) | -        | 3.25 (0.0)   | -                      | 2.33 (0.0)    | -       |                                   |        |         |
| Monthly income (₦)                |     |                           |              |         |                          |              |         |         |        |         |                               |              |         |                                   |        |         |
| ≤₦20,000                          | 6   | 11.17 (2.79)              | 8.24-14.09   | 0.019*  | 76.00 (7.43)             | 68.20-83.80  | 3.96 (0.28) | 3.66-4.26 | 3.83 (0.41) | 3.78-4.26  | 4.02 (0.22)                | 3.78-4.26   | 0.690   |                                   |        |         |
| >₦20,000                          | 10  | 15.60 (2.91)              | 13.52-17.68  | 0.057   | 63.60 (11.00)            | 55.7-71.47   | 4.00 (1.05) | 3.25-4.75 | 4.05 (1.18) | 3.19-4.77  | 3.91 (1.10)                | 3.19-4.77   | 0.690   |                                   |        |         |
| >₦50,000                          | 19  | 15.05 (4.29)              | 12.99-17.11  | 0.294   | 65.63 (8.42)             | 61.57-69.69  | 3.94 (0.96) | 3.48-4.41 | 3.83 (0.89) | 3.45-4.54  | 3.99 (1.14)                | 3.45-4.54   | 0.690   |                                   |        |         |
| >₦100,000                         | 3   | 20.0 (2.65)               | 13.43-26.57  | 0.005*  | 54.33 (3.79)             | 44.93-63.74  | 4.36 (1.30) | 1.13-7.59 | 4.50 (1.00) | 1.10-7.50  | 4.30 (1.29)                | 1.10-7.50   | 0.690   |                                   |        |         |
| I will not say                    | 13  | 12.54 (5.24)              | 9.37-15.70   | 0.019*  | 61.00 (8.27)             | 56.00-66.00  | 3.66 (1.16) | 2.95-4.36 | 3.98 (1.32) | 2.78-4.25  | 3.51 (1.22)                | 2.78-4.25   | 0.690   |                                   |        |         |

* p<0.05; a: ANOVA; b: Independent t-test; CI: Confidence interval; SD: Standard deviation; AQL: Asthma quality of life
defined the working-age population as ages between 15 and 65 years (18). In a New York City study, the primary caregiver for most of the children was their mother with the mean caregiver’s age being 33.4 ± 7.5 years and 34.2 ± 8.8 years for Hispanics and African-Americans, respectively (19). In another Nigerian study, mothers constituted 88.5% of the caregivers with the mean age of the caregivers being 38.6 ± 9.1 years (20). Furthermore, almost all the caregivers (97.5%) in a study conducted in Riyadh, Saudi Arabia, were the mothers of the children with a mean age of 35.2 ± 5.6 years (21). Another study that evaluated the association of QoL of caregivers of children with asthma severity and health-care utilization had most of the caregivers as mothers aged between 31 and 40 years old (22). Thus, we should expect a loss of productivity hours if these caregivers are workers since they majorly fall within the working-age population. Caregivers who are students could miss lecture periods while in the hospital. These would be worsened if their children have poor asthma control necessitating frequent hospital visits. The findings of our study also revealed that more female caregivers had better asthma knowledge than their male counterparts. Women are usually the predominant providers of informal care for family members with chronic diseases (23,24).

A quarter of the caregivers reported having a family history of asthma compared to more than 70% in the study conducted in New York City (19). Although caregivers with a family history of asthma might have good knowledge about childhood asthma, the findings of our study revealed no significant association (20).

About a quarter of the caregivers could identify the three main symptoms of asthma. This corroborates the findings of a Spanish study where only 21.5% of the caregivers could enumerate these three symptoms (25). The percentage of caregivers who correctly identified that asthma causes airway swelling, mucus production, and muscle constriction was between 82% and 97% in the New York City study (19). Young children are more dependent on their caregivers for overall health care and medication administration (20). Early identification of worsening symptoms of asthma could be lifesaving. Caregivers should also have a good understanding of the treatment steps when there is an asthma exacerbation.

The majority of the caregivers had received some level of formal education. Another study documented that caregivers’ attainment of post-secondary education was significantly associated with good knowledge about childhood asthma (20). It is necessary to tailor the asthma education to the educational level of caregivers (26).

Dust, smoke, cold, and exercise were the major asthma triggers identified by the caregivers. There were similarities with a study conducted in Jazan, Saudi Arabia, where the possible triggers identified by the caregivers included dust mites (89.2%), tobacco (81.6%), animal dander (48.8%), cold air (43.2%), and cold drink (31.6%) (27). Contrarily, roach exposure was the most common trigger for asthma in the New York City study (19). Caregivers need to strive to identify the specific asthma triggers for their children, document them in an asthma control diary, and ensure their children avoid these triggers.

Less than half of the caregivers had a good knowledge of asthma. This was in concordance with the study conducted in Ilesa, Nigeria, where about two-thirds of the caregivers had poor knowledge about childhood asthma (20). Poor knowledge of asthma can lead to preventable deaths. Well-informed caregivers would be able to keep calm during an exacerbation and are in a better position to teach asthma self-management skills, a vital skill in the management of chronic diseases. If caregivers and their children can make informed decisions, total dependence on health professionals during their children’s asthmatic attack would be minimized (27). A study revealed that children of caregivers with poor asthma knowledge were 4 times more likely to have a prolonged hospital stay as compared to those with adequate asthma knowledge and education (28).

Less than half of the caregivers had misconceptions about addiction to asthma drugs. Inhalers are an important part of asthma treatment and poor adherence to inhalers is associated with a higher risk of emergency department visits and hospital admissions in children (29). The fear of addiction to asthma medicines may lead to caregivers failing to administer controller inhalers to their children. Misunderstandings about the disease and the underuse of asthma inhalers and medications may lead to poor asthma control (30,31).
Few caregivers could write down the generic or brand names of relievers or controller medicines. This is a surprising fact considering that none of the children were newly diagnosed for asthma. It is possible that these caregivers were conversant with these medicines but did not know the appropriate terminology for them. Nigeria is reported to have poor health literacy (32). Similar results have been obtained in other countries. In a Spanish study, some caregivers listed salbutamol for maintenance treatment while a Sri Lankan study revealed that only 35.4% of the caregivers were able to name a reliever medication correctly (25,33).

Less than half of the caregivers showed positive attitudes toward their children’s asthma. The majority of the caregivers agreed that most people can control their asthma without seeing a doctor regularly. This differed from the findings of the study in Ilesa, Nigeria, where 65.4% of the caregivers believed that only doctors could prevent an asthma attack (20). Some caregivers might have a lower threshold for doctor consultation as they believe that any delay would be detrimental to the child’s health (34). The attitudes toward asthma, if positive, can improve control (26).

The majority of the caregivers agreed that students with asthma could engage in physical activities. Many children with asthma avoid or are prevented by their caregivers from engaging in physical activity or strenuous activities. This might interfere in the assessment of asthma control parameters, relevant for evaluating the impact of asthma on the daily activities of a child (21,35). Caregivers might want to avoid the burden that comes with managing asthma exacerbations by limiting their child’s physical activity, but this could affect the overall development of the child (36). Children with well-controlled asthma can lead normal lives (37). The control of asthma in children is related to the level of both the knowledge and attitude of caregivers (38).

The overall score for the PACQLQ implied a poor QoL. The caregivers had both impaired activity and emotional function from managing asthma in their children. In another study, most of the caregivers had a mean PACQLQ score of 4, indicating a moderate degree of impairment and the caregiver QoL was influenced by the severity of their child’s asthma (22). A Brazilian study revealed that parents/caregivers of children with asthma have a lower QoL compared to those with healthy children (39). Lower QoL among caregivers of children with poorly controlled asthma has been associated with higher life stress, greater asthma caregiving stress, and lower asthma control overtime (40). Caregivers of children with uncontrolled asthma have greater work and activity impairment resulting in lower QoL for emotional, time-related, and family activities (41,42).

Education of parents/caregivers of asthmatic patients on asthma in small groups has been found to improve their knowledge and attitudes (43). Hospital stay should be considered an opportunity to educate children and their families about asthma (28). Tailored education programs for caregivers of young children with asthma seem to be beneficial for increasing caregivers’ asthma knowledge, QoL, and self-efficacy in the management of their children’s asthma (44).

There are several limitations to our study. One tertiary hospital was utilized and the differences in the services rendered between hospitals might lead to variations in responses. Furthermore, the findings may not be generalizable to all caregivers of asthmatic children. Moreover, the study is limited by its sample size. It is also possible that the information provided by the caregivers might not reflect the exact problems experienced by asthmatic patients. Since we utilized self-administered questionnaires, recall bias cannot be excluded. Nevertheless, this study has been able to highlight, in a Nigerian setting, the knowledge, attitudes, and QoL of caregivers toward asthma in their children. Future studies should employ interventions targeted at improving the knowledge, attitudes, and QoL of caregivers managing asthmatic children and assess the impact of these interventions on asthma outcomes.

**CONCLUSION**

Less than half of the caregivers had good asthma knowledge and positive attitudes toward asthma in their children. They had an impaired QoL from managing asthma in their children. The regular provision of educational resources to bridge possible...
gaps in the knowledge of asthma might positively influence the attitudes and improve the QoL of caregivers.

COMPETING INTEREST
The authors declare that they have no conflicts of interest.

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