# Assessment of Knowledge of Physicians and their Practices in Managing Asymptomatic Hyperuricemia at Primary Health centers in Bisha Province, Saudi Arabia

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## Abstract

Objectives: The study objective was to determine the knowledge and management practices of primary care physicians on the management of asymptomatic hyperuricemia (AH).

Setting: The study was carried out in the outpatient clinic of Primary Health Centers (PHC) across Bisha Governorate in Saudi Arabia.

Method: We report on 165 primary care physicians involved in the management of AH. The Knowledge of basic pathophysiology of AH, clinical and laboratory assessments, as well as management recommendations based on dietary and initiation of urate-lowering therapy (ULT), were part of the adapted questionnaire. Their Knowledge of AH and their practices were assessed based on a scale developed to determine the appropriateness of their practices against the gold standard. Knowledge and practices were graded to good/adequate or poor/inadequate as observed and reported. Data was analyzed using SPSS v 23.

Primary outcome measure: The primary outcome measure was determining the proportion of the respondents with adequate Knowledge and practices of AH management.

Results: The mean age of the respondents was 41.3 years, with a standard deviation of 8.6. All the respondents work in public health facilities. Good knowledge and practices of AH were observed among 142 (86.6%) and less than half (72, 43.9%) of the physicians. Years of experience and having read about AH in the last 12 months were the factors found to be associated with good practice (P<0.05). When compared, significant association was found between GPs and other doctors on treating patients with comorbidities and arthropathy using urate-lowering therapies(P<0.05).

Conclusions: In the primary care setting studied, a high proportion of the physicians have adequate Knowledge about AH, but less than half of them put this Knowledge into practice. Good practices of AH management were determined by years of experience and reviewing the literature. Emphasis should be made on the practices of the physicians for proper service delivery.

Key words: Asymptomatic hyperuricemia, Primary health care physicians, Bisha Governorate, KSA

## Introduction

Gout is the most common inflammatory arthritis in men(1) and results in considerable morbidity and utilization of healthcare resources(2). The past 30 years have witnessed a steady increase in the prevalence of gout(3).

Gout is a chronic crystal deposition disorder in which crystals of monosodium urate can cause chronic arthritis, tophi, urolithiasis and renal disease, as well as recurrent acute arthritis and bursitis. Gouty arthritis and tophi can lead to chronic disability and impairment of health related quality of life(4), but gout is also frequently associated with comorbidities such as obesity, diabetes mellitus, hypertension, and cardiovascular disease(5,6), as well as with increased mortality(6,7). Elevation of serum uric acid (SUA) levels, or hyperuricemia, is an essential prerequisite for gout development. Hyperuricemia is defined as a serum uric acid level greater than 7.0 mg/dL in men or greater than 6.0 mg/dL in women(8).

As SUA levels rise, and the physiological saturation threshold for uric acid is exceeded in body fluids, the formation and deposition of monosodium urate (MSU) crystals occur in and around joints (9). The clinical picture of gout is divided into asymptomatic hyperuricemia, acute gouty arthritis, and chronic tophaceous gout. The progression from asymptomatic hyperuricemia to advanced gout is quite variable from person-to-person. In most people, it takes many years to progress(10).

Asymptomatic hyperuricemia is common and does not in itself constitute a disease. During this period, urate deposits may directly contribute to organ damage. This does not occur in everyone, however, and at present, there is no evidence that treatment is warranted for asymptomatic hyperuricemia(10). Diagnosis of gout is made through laboratory and radiological investigations.

The causes of hyperuricemia are known, and urate-lowering treatments can maintain serum urate concentrations at less than saturation, which prevents crystal formation and dissolves existing crystals, making gout the only joint arthritis where the pathogenic agent can be eliminated. Addressing risk factors for hyperuricemia (e.g., overweight, excessive alcohol intake, high dietary intake of purines and fructose) is advised along with medical treatment.

The general prevalence of gout is 1-45% in the general population (11). This prevalence differs between men and women and rises with increasing age. Hyperuricemia is considered the most critical risk factor for the development of gout. Although hyperuricemia and gout have historically been considered men's conditions, growing evidence suggests a substantial disease burden of gout among older women. In the last few decades, the prevalence of hyperuricemia is increasing rapidly in the world population. Emerging evidence shows that hyperuricemia is prevalent not only in developed countries (12) but also in low and middle-income countries with a high frequency (13). Lifestyle factors like obesity, abundant purine diet and alcohol intake are determined to be independent predictors for hyperuricemia (14-16).

Asymptomatic hyperuricemia and gout are predominantly managed in the primary care setting. However, the current medical management of gout is often reactive rather than preventative(17) . Hyperuricemia and gout are common diseases that can, as a general rule, be treated by general and family physicians. However, there is a wide variety of diagnosis and treatment departments that treat hyperuricemia and gout. These are diseases for which guidelines recommended are demonstrably useful (18).

The availability of curative treatment for gout care remains suboptimum(19,20). In the UK, gout is managed predominantly in primary care by general practitioners (GPs), but less than half of patients receive urate-lowering therapy(19,21). In those who do, the dose is usually fixed without titration to achieve a target serum urate concentration(21), and adherence is low (22).

Common misconceptions about gout (e.g., that it is not a serious condition and that it is self-induced by lifestyle) are significant barriers to care(20,23) and, therefore, education of patients is central to management(19,24). Unfortunately, some physicians share these misconceptions(25), and many, because of factors such as work pressures, might have insufficient time to educate patients adequately. Similarly, deficits in the quality of care provided to gout patients have been well documented in both the acute and chronic management of gout (26,27). These deficits include medication errors with inappropriate dosing of allopurinol and colchicine (26) and initiation of a ULT during an acute gout attack(27).

Besides, there is inadequate patient education on gout, including lifestyle recommendations and the role of medications (28,29). In recognition that gout is often poorly managed and misdiagnosed or diagnosed late in its course, both European rheumatology societies and American researchers have published evidence-based recommendations for the diagnosis and medical management of gout.

The European League Against Rheumatism published updated recommendations for the management of gout in 2016, comprising 3 overarching principles and 11 key recommendations for clinical practice (30). Patient education about the pathophysiology of gout and its comorbidities and the existence of effective treatments are essential, and understanding the principles of managing acute attacks and eliminating urate crystals by the lifelong lowering of the serum urate (SU) below a target level are essential. Advice about lifestyle, diet, weight, and other risk factors and the need to screen for and manage comorbidities are emphasized (30). For the treatment of flares, colchicine, nonsteroidal anti-inflammatory drugs (NSAIDs), and oral or intraarticular steroids, or a combination thereof, are recommended. Most of the guidelines recommended for gout management were short of stating clearly the steps that could be used to manage asymptomatic hyperuricemia. Although asymptomatic hyperuricemia has been recognized as an initial trend towards gout development, primary care physicians are left with conflicting personal information on when to

initiate treatment to avert the progression of asymptomatic hyperuricemia full-blown gout. Our study, therefore, examines the knowledge of primary care providers and their practices regarding the management of AH and compares them with recommended standards.

## Methodology

**Study Area:**
The study area is Bisha, a province under the Asir region, Southwestern Saudi Arabia. Health services are administered under the supervision of the Directorate of Health service. There are 92 PHCs in the province and a secondary health facility that serves as a referral center.

**Study Design:**
This study followed a cross-sectional study design.

**Study Population: (including Inclusion and Exclusion Criteria)**
The study populations included all physicians that provide primary healthcare in the selected facilities. These are board-certified physicians and of different nationalities and medical specialties. Physicians working outside the study area were excluded.

**Sample size:**
A whole population study was carried out. The primary care physicians who work in the province were all eligible to participate in the study. The physicians who provide services at public health centers were obtained from the Directorate of health services in Bisha. These constitute our study population. A mail-in questionnaire was sent to them for their responses.

**Data Collection Plan:**
The questionnaire for the study was adapted from similar studies done elsewhere (31) to address our study objectives. The questionnaire was semi-structured and had different sections. The first section collected information on sociodemographic data of the participant (race, gender, board certification, location of practice), physician clinical practice characteristics (practice setting, hours involved in patient care daily and weekly and years since completion of residency). AH/gout patient experience; Knowledge of AH/gout, its pathophysiology, etiology, management, comorbid conditions, treatment used, and counselling of patients. Additionally, there were questions on exposure to continuing medication education, awareness of the gout quality of care indicators and treatment recommendations. Diet and alcohol intake, which are risk factors for incident gout and triggers for recurrent attacks, were explored. We used the EULAR guidelines to develop some of these questions. Five research assistants were trained on how to collect data. The research assistants were healthcare students who had previous experience in research. The questionnaire was be pre-tested on four primary care physicians to identify any need for further validation before the study's commencement. Questionnaires were administered to the respondents at their various healthcare facilities during working hours.

Collected data were entered into the Statistical Package for Social Sciences (IBM, SPSS version 20) for analysis. Categorical variables were presented in frequencies, proportions and percentages. The knowledge of the physician was assessed based on a scoring system carefully developed. For every correct response, one mark's score is given and a zero score for the wrong answer. Similarly, the practice was assessed on a practice scale and graded accordingly. The Knowledge and Practice of AH/gout were graded based on a score scale as either GOOD/adequate or poor/inadequate. Reported treatment/management practices for AH/gout were compared with the published quality of care indicators and treatment recommendations. Tests of associations between categorical variables were performed, and significant association was considered ($P<0.05$).

**Ethical Considerations:**
Permission to carry out this study was sought from the ethical committee of UBCOM-RELOC. Ethical clearance was obtained from the Directorate of Health Services, Bisha, and consent from the physicians before participating in the study.

## Results

Table 1 shows that the total number of questionnaires filled and returned was 164. The age of the respondents ranged from 27-64 years. The mean age of the respondents was 41.3 years, with a standard deviation of 8.6. All respondents (n=164) worked in public health facilities and the number of patients seen per week with AH ranges from one to four. Table 1 also shows that the number of physicians that have ever attended a continuous medical education (CME) on hyperuricemia or gout was 45 (27.4%), though 88.4% (n=145) have claimed to have read about AH/gout within the last 12 months. The majority (82.3%) have reported being aware of guidelines in existence for the management of AH and gout. Thirteen physicians (7.9%) admit to be suffering from gout, and 39.6% claimed they have relatives suffering from either AH or gout.

Figure 1 shows that good knowledge of asymptomatic hyperuricemia was observed in 142 (86.6%) of the physicians interviewed, while 13.4% (n=22) had inadequate knowledge of asymptomatic hyperuricemia. Only 72 physicians (43.9%) had good practices regarding asymptomatic hyperuricemia.

Physicians' knowledge about AH did not differ significantly according to their sociodemographic features, while their practices of AH management were observed to be significantly associated with their years of experience and reading about AH ($p=0.043$ and $p=0.023$, respectively), as shown in Table 4.

The practice of general physicians was compared with that of other physicians in PHCs. Table 5 shows AH management practices that were compared and significant practices were observed using ULT to treat patients with comorbidities ($P=0.02$) and arthropathies ($P=0.019$).

**Table 1: Sociodemographic characteristics of the respondents**

| Sociodemographic features | Frequency (n=164) | Percentage |
|---|---|---|
| Age | | |
| • 25-34 | 46 | 28.0 |
| • 35-44 | 62 | 37.8 |
| • 45-54 | 40 | 24.4 |
| • 55-64 | 16 | 9.8 |
| • Mean±SD | 41.3±8.6 years | |
| Sex | | |
| • Male | 107 | 65.2 |
| • Female | 57 | 34.8 |
| Medical specialty | | |
| • General practitioners | 103 | 62.8 |
| • Family physicians | 48 | 29.3 |
| • Paediatrics | 5 | 3.0 |
| • Gynaecology | 4 | 2.4 |
| • Surgery | 2 | 1.2 |
| • Community medicine | 2 | 1.2 |
| Place of practice | | |
| • Urban | 73 | 44.5 |
| • Rural | 91 | 55.5 |
| Board certification | | |
| • Yes | 105 | 64.0 |
| • No | 59 | 36.0 |
| Years of experience | | |
| • <5 | 29 | 17.7 |
| • 6-10 | 63 | 38.4 |
| • 11-15 | 24 | 14.6 |
| • >16 | 48 | 29.3 |
| Attending CME on AH or gout | | |
| • Yes | 45 | 27.4 |
| • No | 119 | 72.6 |
| Reading about AH or gout within last year | | |
| • Yes | 145 | 88.4 |
| • No | 19 | 11.6 |
| Awareness of guidelines on management of AH or gout | | |
| • Yes | 135 | 82.3 |
| • No | 29 | 17.7 |

**Table 2: Knowledge of Asymptomatic hyperuricemia (n=164)**

| Knowledge of AH assessed | Correct No. (%) | Incorrect No. (%) | Do not know No. (%) |
|---|---|---|---|
| Serum uric acid level is >7.0 mg/dl in men | 141 (86.0) | 18 (11.0) | 5 (3.0) |
| Serum uric acid is >6.0 mg/dl in women | 112 (68.3) | 44 (26.8) | 8 (4.9) |
| Serum urate level is less than urate solubility | 59 (36.0) | 58 (35.4) | 47 (28.7) |
| Uric acid precipitates cause an inflammatory response | 80 (48.8) | 77 (47.0) | 7 (4.3) |
| Uric acid manifests as monosodium crystals | 96(58.5) | 34(20.7) | 34(20.7) |
| AH always progresses to gouty arthritis | 115 (70.1) | 41(25.0) | 8 (4.1) |
| AH may persist without progression | 127(77.4) | 28(17.1) | 9(5.5) |
| AH is the same as gout | 120 (73.2) | 35(21.3) | 9(5.5) |
| AH is different from gout | 111(67.7) | 45 (27.4) | 8 (4.1) |
| Elevated serum urate corresponds with symptoms | 117(71.3) | 38(23.2) | 9(5.5) |
| Normal urate level may occur with gouty arthritis | 108(65.9) | 39(23.8) | 17(10.4) |
| AH Always needs treatment | 45(27.4) | 111(67.7) | 8(5.5) |
| In AH there is increased urate production | 158(96.3) | 0 (0.0) | (3.7) |
| In AH there is decreased renal excretion of urate | 142(86.6) | 17(10.4) | 5(3.0) |

**Figure 1: Physicians' grades of knowledge and practice regarding Management of asymptomatic hyperuricemia**

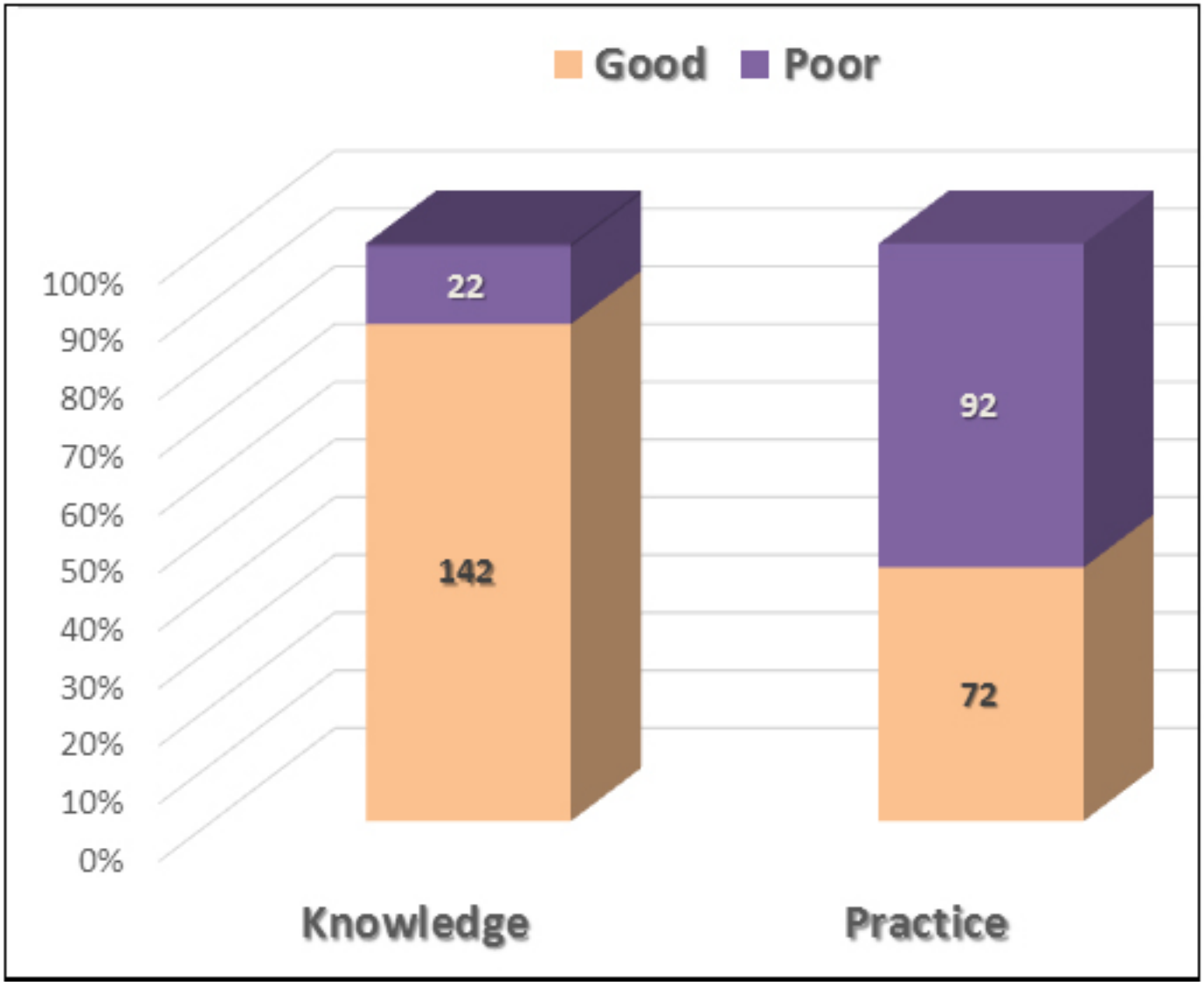

**Table 3: Management Practices of AH in the Health centers (n=164)**

| Management of AH | Good Practice No. (%) | Poor practice No. (%) |
|---|---|---|
| History | | |
| Renal stone | 159 (97.0) | 5 (3.0) |
| Diabetes | 141 (86.0) | 23 (14.0) |
| Ischemic Heart Diseases | 141 (86.0) | 23 (14.0) |
| Thyroid diseases | 109 (66.5) | 55 (35.5) |
| Asthma | 78 (47.6) | 86 (53.4) |
| The decision not affected by any condition | 39 (23.8) | 125 (76.2) |
| Family History | 138 (84.1) | 26 (15.9) |
| Intake of high purine diets | 155 (94.5) | 9 (5.5) |
| Drugs history e.g. Thiazides | 154 (93.9) | 10 (6.1) |
| History of blood dyscrasias, e.g. multiple myeloma | 134 (81.7) | 30 (18.3) |
| Alcohol intake | 141(86.0) | 23 (14.0) |
| | | |
| Laboratory requests for AH management | | |
| 24 h urine uric acid | 92 (56.1) | 72 (43.9) |
| Serum creatinine | 103 (62.8) | 61 (37.2) |
| Urinalysis | 96 (58.5) | 68 (41.5) |
| LFT | 43 (26.2) | 121 (73.8) |
| CBC | 52 (31.7) | 112 (68.3) |
| Ca level | 103 (62.8) | 61 (37.2) |
| ECG | 41 (25.0) | 123 (75.0) |
| | | |
| Drug management of AH | | |
| Knows at least one condition to initiate drug therapy: *(contraindications, flare onset, number and type of joints involved or previous experience with treatments)* | 152 (93.7) | 12 (7.7) |
| Initiate low-purine diet and lifestyle recommendations in a patient with AH | 145 (88.4) | 19 (11.6) |
| Knows when to initiate non-steroid anti-inflammatory drugs (NSAIDs) in a patient with AH | 64 (39.0) | 100 (61.0) |
| Knows when to initiate treatment with colchicine in a patient with AH | 100 (61.0) | 64 (39.0) |
| Recommends allopurinol in patients with normal kidney function for first-line ULT | 154 (93.9) | 10 (6.1) |
| Use Febuxostat or a uricosuric where allopurinol cannot be tolerated | 101(61.6) | 63 (38.4) |
| Check serum urate levels monthly in patients with AH | 19 (11.6) | 145 (88.4) |
| Knows when to start ULT in AH patients | 72 (43.9) | 92 (56.1) |

**Table 4: Relationship of respondents' knowledge and practice regarding asymptomatic hyperuricemia with sociodemographic features. (n=164)**

| Sociodemographic features | Knowledge | | P-value | Practice | | P-value |
|---|---|---|---|---|---|---|
| | Good | Poor | | Good | Poor | |
| Age (years) | | | | | | |
| • <30 | 14 | 1 | Fisher | 4 | 11 | Fisher |
| • >30 | 128 | 21 | 0.371 | 68 | 81 | 0.127 |
| Sex | | | | | | |
| • Male | 91 | 16 | $\chi^2$ | 43 | 64 | |
| • Female | 51 | 6 | 0.43 | 29 | 28 | 0.865 |
| Medical specialty | | | | | | |
| • General practice | 88 | 15 | | 47 | 56 | |
| • Family medicine | 42 | 6 | $\chi^2$ | 18 | 30 | |
| • Paediatrics | 2 | 0 | 0.848 | 2 | 3 | 0.520 |
| • Gynaecology | 3 | 1 | | 3 | 1 | |
| • Surgery | 5 | 0 | | 1 | 1 | |
| • Community medicine | 2 | 0 | | 1 | 1 | |
| Place of practice | | | | | | |
| • Urban | 66 | 7 | $\chi^2$ | 33 | 40 | |
| • Rural | 76 | 15 | 0.198 | 39 | 52 | 0.763 |
| Board certification | | | | | | |
| • Yes | 91 | 14 | $\chi^2$ | 45 | 60 | |
| • No | 51 | 8 | 0.967 | 27 | 32 | 0.719 |
| Years of experience | | | | | | |
| • <10 | 78 | 14 | $\chi^2$ | 34 | 58 | |
| • >10 | 64 | 8 | 0.44 | 38 | 34 | 0.043* |
| Attended CME | | | | | | |
| • Yes | 41 | 4 | $\chi^2$ | 22 | 23 | 0.253 |
| • No | 101 | 18 | 0.296 | 49 | 70 | |
| Have Hyperuricemia/gout | | | | | | |
| • Yes | 56 | 9 | $\chi^2$ | 4 | 9 | Fisher |
| • No | 86 | 13 | 0.895 | 68 | 83 | 0.243 |
| Read about AH | | | | | | |
| • Yes | 125 | 20 | $\chi^2$ | 68 | 77 | Fisher |
| • No | 17 | 2 | 0.694 | 4 | 15 | 0.023* |

*Statistically significant: P<0.05

**Table 5: Comparing the GPs Management Practice with that of other doctors**

| Statements | GPs N=103 | Other N=61 | Test Statistics | P-Value |
|---|---|---|---|---|
| Knows when to choose ULT | 100 | 60 | Fisher's Exact | 0.524 |
| Knows when to initiate low-purine diet and lifestyle recommendations | 92 | 53 | $\chi^2$ | 0.638 |
| Initiates non-steroid anti-inflammatory drugs (NSAIDs) to a patient newly diagnosed with AH | 42 | 22 | $\chi^2$ | 0.550 |
| Initiates treatment with colchicine to a patient newly diagnosed with AH | 64 | 36 | $\chi^2$ | 0.692 |
| Initiates urate-lowering therapy (ULT) using xanthine oxidase inhibitor | 98 | 56 | Fisher's Exact | 0.294 |
| Uses ULT for treating patients with flares | 7 | 6 | Fisher's Exact | 0.339 |
| Uses ULT for treating patients with tophi | 22 | 12 | $\chi^2$ | 0.797 |
| Uses ULT for treating patients with arthropathy | 46 | 16 | $\chi^2$ | 0.019* |
| Uses ULT for treating patients with renal stone | 18 | 12 | $\chi^2$ | 0.725 |
| Uses ULT for treating patients with comorbidities | 10 | 14 | $\chi^2$ | 0.020* |
| Allopurinol is recommended for first | 72 | 48 | $\chi^2$ | 0.220 |
| Febuxostat or a uricosuric is indicated where allopurinol cannot be tolerated | 63 | 38 | $\chi^2$ | 0.886 |

Statistically significant: P<0.05

## Discussion

We assessed the knowledge of physicians in the management of asymptomatic hyperuricemia at primary health centers. Our finding shows a very high level of knowledge of causes and the pathophysiology of asymptomatic hyperuricemia. This result differs from what was reported by Alqarni in Saudi Arabia(32) where she reported that about a third of the physicians have adequate knowledge of AH at primary health centers.

Though the geographical settings and methodological issues could have accounted for these differences, this study focused on the disease pathology's technical aspect. Hyperuricemia is considered the most critical risk factor for the development of gout, and knowledge and proper management at the primary care level will help reduce the progression of the disease to gout. Several studies have demonstrated suboptimal management of gout in primary care, often attributable to poor management skills(33,34).

Our study reported primary care physicians having high knowledge or information on AH, similar to what was reported by Spencer et al. (35) and that physician education is essential if patient and provider barriers are to be managed. Several studies have shown that an inadequate understanding of gout's causes and consequences, together with distorted, stereotypical, and generally negative views about gout and its treatment, is associated with lower adherence to ULT and suboptimal disease control(36,37). Thus, this study has demonstrated that better provision of information and a package of care based on guideline recommendations will provide better options for patient management.

The dietary recommendation practices were shown to be a demonstration of good practice by the physicians. George Nuki has also advocated dietary advice to patients with AH or gout. Thus, regular exercise, weight loss, avoidance of alcohol, meat, seafood, cheese, sugar¬ sweetened drinks must be discouraged(30).

Our study further demonstrated that the practice of initiating urate-lowering drugs by physicians varies. The physicians have demonstrated the knowledge of conditions needed to avoid placing the AH patients on ULT. While the target was to maintain a serum urate level below 6 mg/dl for optimal control of AH, certain circumstances may prompt the commencement of ULT for the patients as practiced by our respondents. The presence of acute joint flares, tophi, and comorbidities was shown to warrant ULT by the supervising physicians.

This is similar to practices reported by Schumacher (38) that ULT can reduce gout flares and tophi and improve the quality of life of patients with chronic gouty arthritis(39). The respondents have a good practice regarding caution and screening all their patients for associated comorbidities like cardiovascular risk factors, renal diseases, heart disease, obesity etc. The use of steroids and uricosuric medications has also been highlighted as part of the management practices.

## Conclusion

Less than half of the PHC physicians have good or adequate practices regarding management of AH. However, they demonstrate the capacity to handle AH and gout at the primary care level effectively. More needs to be done to address the practice gap identified and improve service delivery at our primary health centers.

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