

The Utilization Pattern of Non-Steroidal Anti-Inflammatory Drugs among Community-Dwelling Elderly Living in Urban Versus Rural Areas

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Abstract

Background: Increasing life expectancy in the community has led to a growing prevalence of changes and disorders such as arthritis, which has been accompanied by increasing use of Non-Steroidal Anti-Inflammatory Drugs (NSAIDs). However, its utilization pattern may differ among rural and urban elderly. **Aim of the study:** was to assess the utilization pattern of Non-Steroidal Anti-Inflammatory Drugs among community-dwelling elderly living in Urban versus Rural areas. **Subjects & methods: Research design:** A cross sectional descriptive comparative research design was used. **Setting:** Community-dwelling elderly's own homes in two governorates. One is rural from El-Behera Governorate, and the other is urban from Alexandria Governorate. **Subjects:** A convenience sample of 640 Community-Dwelling elderly with three hundred and twenty from each of the above mentioned settings. **Tools of data collection:** I) Mini Mental State Examination (MMSE) Scale II) Community-Dwelling Elders' NSAIDs Utilization Pattern Structured Interview Schedule composed of five parts to collect data about socio-demographic characteristics, NSAIDs utilization pattern, sources of NSAIDs information, presence of contraindications to use NSAIDs and Knowledge of the elderly about NSAIDs. **Results:** NSAIDs users were 580 of the study subjects from both rural and urban areas. Rural participants are significantly more likely to have higher rate relative to urban participants to use of NSAIDs as an analgesic ($p < 0.001$), use of drug as Over-The-Counter (OTC) ($p < 0.001$). And they have experience of NSAIDs' side effect ($p < 0.001$). The majority of both rural and urban study subjects reported that they don't receive any instructions from the nurse about NSAIDs, with no statistically difference. **Conclusion:** NSAIDs utilization was significantly higher among rural than urban residence, whether it was prescribed or non-prescribed (OTC). Rural participants were significantly more likely to had poor level of knowledge about NSAIDs relative to urban participants. **Recommendations:** Community health and gerontological nurses have the responsibility for training the nurses who works in different rural and urban health care settings about NSAIDs.

Keywords: Nonsteroidal Anti-Inflammatory Drugs, community-dwelling elderly, rural versus urban, utilization pattern, community and gerontological nurses.

Introduction:

As life expectancy is continuing to grow all over the world, population aging is a worldwide phenomenon. Elderly individuals usually use large quantities of medicines in the community, mainly due to the high number of chronic illnesses that occur with aging^(1,2). The prevalence of chronic pain increases with age, exceeding 50% in individuals aged ≥ 60 years, in particular musculoskeletal and arthritic conditions. Non-steroidal anti-inflammatory drugs (NSAIDs) are mainstay of chronic pain management.⁽³⁾ The use of NSAIDs has been linked with adverse gastrointestinal and cardiovascular effects, including ulceration and bleeding, elevated

blood pressure, stroke, and worsening heart failure in elderly people.⁽⁴⁾ Elderly patients have an increased risk of the adverse drug reactions (ADRs), and are more likely to take multiple medications that can potentially interact with NSAIDs. In particular, elderly patients are more likely to have cardiovascular disease and a natural age-related decline.⁽⁵⁾

Age-related changes usually impact a drug's safety and efficacy. Among these changes are reductions in liver and kidney function, which affect a drug's absorption and elimination; memory impairments, hearing loss, and visual difficulties that

can make it difficult to understand and remember medication instructions; decline in weight, loss of body fluid, and increased percentage of body fat, which can alter the way drugs distributed and concentrated in the body.^(6, 7)

Aging is associated with common conditions include diagnosed arthritis, hypertension, heart disease, cancer, diabetes, and sinusitis. Comorbidity is associated with polypharmacy, a phenomena where a single person may be prescribed multiple medications from different doctors or by self-prescribing over-the-counter medications (OTCs) for each medical condition present.^(8, 9) Among elders American population, accounted for 34% of prescription drug use and 30% of nonprescription or OTCs medication use.⁽¹⁰⁾

Evidence shows that the place where elderly people live is associated with their quality of life, health status and use of medications. People living in rural areas presented lower quality of life than those from urban areas.⁽¹¹⁾ where the pattern of elderly life in rural and urban is significantly different. Rural people often live in worse socioeconomic conditions and have poorer literacy skills and reduced access to health care services compared with their urban counterparts. The community health and gerontological nurses' role emphasize that health interventions should address the specific demand of each location.^(12, 13)

The primary nursing role for community health and gerontological nurses is the safe administration of medications. However, this requires not only knowing how to correctly administer medications, but also how to determine whether the intended effects are achieved and whether any adverse, or unintended, effects have occurred^(14, 15). The nurse should prompt a thorough review of medications either it was prescribed or

OTC to ensure that the NSAID is not directly or indirectly responsible for any unusual sign or symptom in an elderly patient.^(16, 17) For high risk elderly patients with renal dysfunction, respiratory and heart disease, it is important to recommend other therapies for pain. These other pain therapies include referring elderly patients to their primary doctors for physical and occupational therapy, recommending massage and heat therapy for muscular pain or stiffness.^(18, 19)

Significance of the study

Increasing life expectancy in the community has led to a growing prevalence of changes and disorders such as arthritis, which has been accompanied by increasing use of NSAIDs.⁽²⁰⁾ Aging is also associated with many changes, which affect the drug pharmacokinetic and pharmacodynamics that make the issue of NSAIDs utilization at most importance. As much as 70% of elderly patients frequently use NSAIDs for their musculoskeletal pain.⁽²¹⁾ Although, the NSAIDs is beneficial in relieving of chronic pain, all types of NSAIDs are associated with risk of adverse events related to the gastrointestinal, cardiovascular, and renal systems especially when chronically or inappropriately used.⁽²²⁾ Despite all these problems, some older adults use them without prescription (OTC) which makes the problem even worse. It was estimated that 31% of people 60 years and older were hospitalized due to medication adverse events. In addition to some symptoms such as lethargy, confusion, lightheadedness, falls, constipation, and depression are observed.⁽⁸⁾

The risk of ADRs with NSAIDs is a serious concern, particularly among the elderly. High risk elderly who are taking NSAIDs can worsen their conditions such as elderly patients with hypertension, heart diseases, kidney diseases, and liver diseases.⁽²³⁾

Aim of the study:

The study aimed to assess the utilization pattern of Non-steroidal Anti-Inflammatory Drugs among community-dwelling elderly living in urban versus rural areas.

Research Questions:

What is the utilization pattern of NSAIDs among community-dwelling elderly living in urban versus rural areas?

Subjects and Method:**Research Design:**

A cross sectional descriptive comparative research design was used.

Study Setting:

The study was conducted at the community-dwelling elderly's own homes in two governorates. One is rural from El-Behera Governorate, and the other is urban from Alexandria Governorate. One zone was selected randomly from each governorate, namely Damanhur zone from El-Behera Governorate and Middle zone from Alexandria Governorate.

Study Subjects:

A convenience sample of 640 community-dwelling elderly were included in the study. Three hundred and twenty from each of the above mentioned settings. Inclusion criteria are being 60 years old or more and have no cognitive impairment (score 24 and more on the Mini Mental State Examination.(MMSE).

Using PASS 2000 (Power Analysis and Statistics Software) to estimate the sample size. Minimum sample size of 210 per group total (420) achieves 90% power to detect a difference of 10% in the proportion of NSAID use between rural and urban residence area. As the researchers didn't find a reference comparing rural and urban in the use of NSAIDs, so from the experts background they considered that 10% will be clinically significant difference in the use of

NSAIDs between rural and urban participants. The researchers include 640, 320 per group. The target significance level is .05, using 2-sided Chi-Square test.

Tools of Data Collection:

Tool (I) Mini Mental State Examination (MMSE) Scale: This tool was used for the selection of the study subjects. The MMSE was developed by Folstein, et al⁽²⁴⁾. It is a reliable measure and originally designed for assessing the cognitive function of the elders. The scale includes 30 questions in which the elderly's response is either yes or no. The MMSE was translated into Arabic and approved to be valid and reliable by "Elhusseini"⁽²⁵⁾.

Tool (II) Community-Dwelling Elders' NSAIDs Utilization Pattern Structured Interview Schedule: This tool was developed by the researchers based on literature review. It composed of 5 parts.

Part (1): Socio-demographic characteristics. It includes 9 items such as age, sex, educational level, occupation, marital status, living arrangement and family income.

Part (2): NSAIDs Utilization Pattern. It includes 13 questions, the first question is a corner stone to complete the rest of the questions (Do you currently use NSAIDs). If the answer is yes, the following questions were completed. The other questions include; causes of NSAIDs use, prescription status (prescribed/OTC), total numbers of NSAIDs use, frequency per month, frequency per day, duration of drug use, most common forms use, precautions and side effects.

Part (3): Sources of NSAIDs Information: It includes 3 questions as most preferred health care setting when having health problems, nurse role to provide instructions about the drug, primary source of NSAIDs information.

Part (4): Presence of contraindications to use NSAIDs. It includes 13 questions as: - previous and present history of stroke, heart attack, peptic ulcer/GIT bleeding, renal impairment, liver cirrhosis, bronchial asthma, myocardial infarction, congestive heart failure, uncontrolled hypertension and who undergoing recent surgery called coronary artery bypass graft (CABG). In addition to use of the contraindicated drugs as anti-coagulant, corticosteroids and antidepressant.

Part (5): Knowledge of the elderly about NSAIDs: It includes 31 questions with 5 domains which are; indications, safe and effective use, side effects, warning signs and contraindications to use. The response to the questions is yes, no or don't know to cover all aspects of NSAIDs knowledge.

Scoring system:

- 1. Tool (I): MMSE Score:** is based on the number of correct items, with a maximum of thirty points; possible scores are categorized in the following manner:
 - 24-30: indicates normal cognitive function of the elderly.
 - 18-23: indicates mild cognitive impairment.
 - 0-17: indicates severe cognitive impairment.
- 2. Part (5) in Tool (II): Community-Dwelling Elderly' Knowledge Regarding NSAIDs Score:** The items discrete scores for knowledge scale were "right answer had score 1 and wrong answer/ I don't know had score 0", then the total items summed together, the sum of scores for each dimension and total score was calculated by summing the scores given for its responses. All scores were transformed into score % as follows:

$$\text{Score \%} = \left(\frac{\text{the observed score}}{\text{the maximum score}} \right) \times 100.$$
 Then score % was transferred into categories according to the different scales

- Poor: Score % < 50%
- Fair: Score % 50%-<75%
- Good: Score % ≥75%

Content validity and reliability:

Parts 2,3,4 and 5 from tool II were translated into Arabic language by the researchers and reviewed by a committee composed of 7 experts in the related fields; gerontological nursing, and community health nursing for clarity, relevance, comprehensiveness, and applicability.

Internal reliability of part 5 (Knowledge of the elderly about NSAIDs) = 0.94

Field work:

The period of data collection started from the beginning of April to the end of July 2016, including pilot study, tool validity and reliability. The researchers hired and trained two professional interviewers in order to help in the collection of required data to ensure objectivity and accuracy of data collection. The researchers and the hired interviewers used to visit the homes of the selected study zones according to a schedule. Survey was done to select the study subjects who fulfill the inclusion criteria by using tool (I). The researchers and hired interviewers used to start the home visits according to a schedule from 10 AM to 3 PM five days a week from Sunday through Thursday. Each researcher and hired interviewers used to collect data from elderly who fulfills the inclusion criteria using the study tool II in a face to face interview schedule at once. Each home visit lasted for 60 to 90 minutes with the average of 75 minutes.

Pilot study

A pilot study was done on 64 community-dwelling elders not included in the study subjects, 32 selected from urban setting in Alexandria Governorate and 32 selected from rural setting in El-Behera Governorate to assess the tools for their applicability,

and clarity. Necessary modifications were done accordingly.

Administrative and ethical considerations:

Permission to carry out the study was obtained from the responsible authorities which are the Faculty of Nursing Damanhur and Alexandria Universities and the owner of the home where the elderly live after explanation of the purpose of the study, the date and the time of data collection.

Ethical considerations were considered all over the data collection process. An informed written consent was obtained from all the study subjects. Privacy and anonymity of the study subjects and confidentiality of the collected data was maintained throughout the study.

Statistical analysis:

Data were analyzed using the Statistical Package for Social Sciences (SPSS ver.20 Chicago, IL, USA). Quantitative score data were described using median ,range. Qualitative data were described using number and percent. Mann Whitney U test was used to compare score between 2 groups. Kruskal Wallis test was used to compare score between more than 2 groups. Pearson Chi square used to compare 2 × 2 categorical variables , and Fisher's Exact test when if >20% of cells had expected cell count less than 5. And in > 2×2 table we used. Monte Carlo significance test if >20% of cells had expected cell count less than 5. Cronbach alpha test used to assess internal reliability.

In all statistical tests, level of significance of .05 used, below which the results considered to be statistically significant.

Result:-

Table (1) illustrates the socio-demographic characteristics of community-dwelling elderly by urban versus rural residence area. The age of

the study subjects ranged from 60-65 years old with a mean of 65.68±5.29. Older adults aged from 60 years to less than 65 years constitute 63.1 % of the sample. 55.5% of the study subjects are females, 62.5% illiterate/ read &write, 79.4% not working, 53.8% married, 82.5% live in their own home, with 51.3% of them live with their daughter/son and 54.4% of the community-dwelling elderly had enough family income.

According to *urban vs. rural participants*, rural participants are significantly more likely to have higher percent than urban residence in age which ranged from 60 to less than 65 years old (68.8% vs. 57.5%, $X^2= 10.7$, $p=0.005$), illiterate/ read &write (78.8% vs. 46.2%, $X^2= 100.3$, $p=0.001$), married (56.2% vs. 51.2%, $X^2= 33.7$, $p=0.001$), and live with their daughter/son (52.5% vs. 50%, $X^2= 31.2$, $p=0.001$).

However there is a statistically significant difference between residence area and the living arrangement of the elderly, rural and urban participants have the same percent in the living in their own homes (82.5%, $X^2= 18.6$, $p=0.001$).

Figure (1) demonstrates the current use of NSAIDs among community-dwelling elderly by residence area. The majority of the study subjects (90.6%) are current users of NSAIDs, their number was 580 elders. Rural participants are significantly more likely to be currently users of NSAIDs (98.8% vs. 82.5%, $X^2= 49.7$, $p=0.001$) compared to urban participants.

Table (2) explains the utilization pattern of NSAIDs among currently users of drug by residence area. The first cause of NSAIDs use among 82.1% of the study subjects is analgesic, 81.7% use the drug as OTC, 49% currently use 4-6 NSAIDs. During the past month, 40.7% of the study subjects

use NSAIDs for 8-14 days, 44.1% use NSAIDs one time per day, 86.2% use NSAIDs for 6 months and more, 52.4% use multiple forms of NSAIDs as tablet, ointment, and injection. Only 17% of oral users of NSAIDs take tablet with food and plenty of water, 55.6% double doses in case of severe symptoms and only 15.9% of topical users of NSAIDs wash their hands after use. 69% of the community-dwelling elderly complains of side effects as a result of use NSAIDs with 48% of them describe it as a moderate side effects.

Regarding the participant characteristics, rural participants are significantly more likely to have higher rate relative to urban participants to use of NSAIDs as an analgesics (87.3% vs. 75.8%, $X^2= 13.4$, $p=0.001$), use of drug as OTC (94.6% vs. 66.3%, $X^2= 77.3$, $p=0.001$), currently use 4-6 NSAIDs (59.5% vs. 36.4%, $X^2= 42.8$, $p=0.001$), frequency of using one time per day during the past month (59.5% vs. 25.8%, $X^2= 102.2$, $p=0.001$), for duration of 6 months or more (92.4% vs. 78.8%, $X^2= 22.9$, $p=0.001$), use multiple forms as tablet, ointment, and injection (83.5% vs. 15.2%, $X^2= 269.4$, $p=0.001$), and they have experience of NSAIDs' side effects (84.8% vs. 50%, $X^2= 81.4$, $p=0.001$).

On the other hand, rural participants are significantly less likely to use NSAIDs for 8-14 days during the past month (26.6% vs. 57.6%, $X^2= 69.1$, $p=0.001$) relative to urban participants.

Among oral users of NSAIDs, rural participants are significantly less likely than urban participants in using tablet with food and plenty of water (5.5% vs. 30.6%, $X^2= 60.1$, $p=0.001$) and double doses in case of severe symptoms (27.4% vs. 88.7%, $X^2= 204.1$, $p=0.001$).

Table (3) describes the sources of NSAIDs information among currently users by residence area. 8.1% not prefer health care settings when having any health problem, 48.6% prefer non-governmental settings and 43.3% governmental settings. Among those who prefer health care settings when having any health problem (91.9%), only 2.8% of them reported they were received instructions about NSAIDs use from the nurse. Regarding the primary source of information of the study older adults, 42.9% prefer a physician, while only 3.5% prefer a nurse.

Comparing to *urban vs. rural participants*, rural participants are significantly less likely to prefer non-governmental health care setting when having any health problem (31.6% vs. 68.9%, $X^2= 81.7$, $p=0.001$) relative to urban participants.

However there is a statistically significant difference between residence area and the primary source of NSAIDs information among current users, rural and urban participants have nearly the same percent in preferring a nurse as a primary source of medication information (3.8% vs. 3%, $X^2= 95.7$, $p=0.001$).

Table (4) reveals the contraindications to use NSAIDs among currently users by residence area. Community-dwelling elderly who currently use of NSAIDs and have uncontrolled hypertension constitute 85.5% of study subjects, followed by 73.1% MI, 56.6% previous history of renal impairment, 52.4% previous history of peptic ulcer/GIT bleeding, 49% use anti-coagulant drugs, 47.6% CHF, 44.1% bronchial asthma, 37.2% use corticosteroids drugs, 31.7% previous history of heart attack, 30.3% liver cirrhosis, 28.3% previous history of stroke, 13.8% use antidepressant drugs, while only 7.6% undergo recent heart surgery CABG.

According to *residence area*, rural participants are significantly higher prevalence than urban participants in having history of heart attack (36.7% vs. 28.8%, $X^2= 7.9$, $p=0.005$), peptic ulcer/GIT bleeding (78.5% vs. 21.2%, $X^2= 189.1$, $p=0.001$), renal impairment (82.3% vs. 25.8%, $X^2= 187.1$, $p=0.001$), liver cirrhosis (40.5% vs. 8.2%, $X^2= 33.9$, $p=0.001$), bronchial asthma (50.6% vs. 36.4%, $X^2= 11.8$, $p=0.001$), uncontrolled hypertension (93.7% vs. 75.8%, $X^2= 37.2$, $p=0.001$), use anti-coagulant drugs (54.4% vs. 42.4%, $X^2= 8.2$, $p=0.001$), corticosteroids drugs (55.7% vs. 15.2%, $X^2= 101.1$, $p=0.001$) and antidepressant drugs (19% vs. 7.6%, $X^2= 15.7$, $p=0.001$).

While, rural participants are significantly less likely to have MI (62% vs. 86.4%, $X^2= 43.3$, $p=0.001$) relative to urban participants.

Table (5) States the contraindications to use NSAIDs among currently users according to their prescription status (prescribed or over the counter) by residence area. Among prescribed NSAIDs and have contraindications to use, 79.2 % of them have MI, followed by 75.5% uncontrolled hypertension, 49.1% CHF, 48.1% use anti-coagulant drugs, 37.7% bronchial asthma, 32.1% previous history of stroke, 32.1% previous history of peptic ulcer/GIT bleeding, 30.2% previous history of renal impairment, 28.3% previous history of heart attack, 25.5% use corticosteroids drugs, 19.8% liver cirrhosis and 15.1% undergo recent CABG. While only 10.4% use antidepressant drugs.

As for *urban vs. rural participants*, rural participants are significantly have higher percent than urban participants in having previous history of stroke (58.8% vs. 27%, $X^2= 6.6$, $p=0.01$), peptic ulcer/GIT bleeding (88.2% vs. 21.3%, $X^2= 29.3$, $p=0.001$), renal impairment (94.1% vs. 18%, $X^2= 39.2$, $p=0.001$), liver cirrhosis (52.9%

vs. 13.5%, $FEP<0.001$), use corticosteroids drugs (70.6% vs. 17.9%, $FEP<0.001$), antidepressant drugs (29.4% vs. 6.7%, $FEP<0.015$) and undergo recent CABG (35.3% vs. 11.2%, $FEP<0.001$).

While, rural participants are significantly less likely to have MI (58.8% vs. 83.1%, $FEP<0.04$) relative to urban participants.

On the other hand, among OTC users of NSAIDs and have contraindications to use. 87.8% of older adults have uncontrolled hypertension, followed by 71.7% MI, 62.4% renal impairment, 57% peptic ulcer/GIT bleeding, 49.2% use anti-coagulant drugs, 47.3% CHF, 45.6% bronchial asthma, 39.9% use corticosteroids drugs, 32.7% liver cirrhosis, 32.5% heart attack, 27.4% stroke, 14.6% use antidepressant drugs, while only 5.9% undergo recent CABG.

Comparing between *urban vs. rural participants using OTC drugs*, rural participants are significantly have higher rate compared to urban participants in having previous history of peptic ulcer/GIT bleeding (77.9% vs. 21.1%, $X^2= 145.1$, $p=0.001$), renal impairment (81.6% vs. 29.7%, $X^2= 126.7$, $p=0.001$), liver cirrhosis (39.8% vs. 20.6%, $X^2= 18.5$, $p=0.001$), bronchial asthma (51.2% vs. 36%, $X^2= 10.2$, $p=0.001$), uncontrolled hypertension (93.6% vs. 77.7%, $X^2= 26.1$, $p=0.001$), use anti-coagulant drugs (55.2% vs. 38.9%, $X^2= 11.7$, $p=0.001$), corticosteroids drugs (54.8% vs. 14.3%, $X^2= 75.7$, $p=0.001$) and use antidepressant drugs (18.4% vs. 8%, $X^2= 11.7$, $p=0.002$).

While, rural participants were significantly less likely to have MI (62.2% vs. 88%, $X^2= 36.2$, $p=0.001$) relative to urban participants.

Figure (2) Demonstrate total level of knowledge score about NSAIDs among currently users by residence area. The majority of study

older adults (87.6%) have poor level of knowledge. Rural participants are significantly more likely to have poor level of knowledge (93.7% vs. 80.3%, $X^2= 27.1$, $p=0.001$) relative to urban participants.

Figure (3) Illustrates the subtotal level of knowledge score about NSAIDs among currently users by residence area. The majority of the study subjects have poor level of knowledge about all items of NSAIDs information. 82.1% of them have poor level of knowledge about indications, 85.5% safe and effective use, 83.4% side effects, 87.6% warning signs and 86.9% about contraindications to use of NSAIDs.

As regard *urban vs. rural study subjects*, rural residence are significantly more likely than urban residence in having poor level of knowledge about indications of NSAIDs (87.3% vs. 75.8%, $X^2= 13.4$, $p=0.001$), safe and effective use (91.1% vs. 78.8%, $X^2= 27.3$, $p=0.001$), side effects (91.1% vs. 74.2%, $X^2= 31.4$, $p=0.001$), warning signs (94.9% vs. 78.8%, $X^2= 35.2$, $p=0.001$) and about contraindications to use of NSAIDs (91.1% vs. 81.8%, $X^2= 10.9$, $p=0.004$).

Table (6) shows the relation between socio-demographic data of the community-dwelling elderly and their current use of NSAIDs. The utilization of NSAIDs among the study subjects is significantly affected by their sex ($X^2= 8.4$, $p=0.004$), educational level ($X^2= 16.3$, $p=0.003$), marital status ($X^2= 26.4$, $p=0.001$), place of residence ($X^2= 49.7$, $p=0.001$), living arrangement ($X^2= 5.6$, $p=0.059$), person lives with elderly ($X^2= 9.5$, $p=0.023$) and their family income ($X^2= 17.3$, $p=0.001$). Higher rate of NSAIDs utilization was observed among younger age group, females, lower level of education, married, living in their own homes, living with daughters/sons and with enough family income.

Discussion:

Utilization of the NSAIDs among community-dwelling elderly need more attention from community and gerontological nurses. Data investigating the issue of utilization of NSAIDs between rural and urban residents is generally scarce, and in Egypt in particular. The present study is one of a few studies in Egypt which assessed the utilization pattern of NSAIDs in a sample of Egyptian community-dwelling elderly from rural and urban areas.

The present study revealed that, the majority of the study subjects are users of NSAIDs in both rural and urban residence. However, older adults in rural area use NSAIDs in a higher rate than those in urban area and the difference is a statistically significant (Figure 1). This finding is in line with a study done in China by Ling⁽³¹⁾. It asserted that, the majority of rural elders have used NSAIDs for their knee pain in the past 12 Months. While two other studies done in the United States by Cicero⁽³²⁾ and Steinman⁽³³⁾ had reported that, the majority of urban elders were using of NSAIDs which contradict the present finding. This contradiction may be related to the fact that NSAIDs is able to provide sufficient pain relief to continue the heavy physical occupational activity for their livelihood required in rural regions of developing countries like Egypt.

The majority of the present study subjects reported that the first cause of NSAIDs use were analgesics. In this respect, rural participants had higher percent than urban participants with a statistically significant difference (Table 2). This finding was congruent with a study done in Romania by Alexa⁽³⁴⁾ which revealed that, rural participants use NSAIDs as a painkiller with a high rate than urban participants. While a previous study done in the United States by Hanlon⁽³⁵⁾ reversed the present finding which

stated that, the majority of urban participants use NSAIDs as an analgesic with a higher percent than rural participants. This inconsistency with the present study may be related to unavailability of rural health care services and increase prevalence of symptomatic knee osteoarthritis was significantly higher in rural compared to urban community-dwelling elders.

In the present research it was detected that, the majority of study elders reported that the first type of prescription status of NSAIDs was OTC. Rural residence were more user of OTC than urban residence with a statistically significant difference (Table 2). This result was supported by other studies done in Egypt by Hamza⁽³⁶⁾ and in Canada by Sadowski⁽³⁷⁾ which declared that, the majority of participating rural elderly were users of OTC NSAIDs. While a previous study done in Romania by Alexa⁽³⁴⁾ opposed the present finding which explained that, the majority of urban elders have turned to be OTC NSAIDs users compared with rural elders. This incongruity with the present study may be related to that rural areas hold different challenges than urban areas for access to healthcare services. Rural elders might be experiencing lower access to prescribed medications and use OTC than urban elders.

In the present study it was observed that, the majority of the study subjects use multiple forms of NSAIDs such as tablets, ointment and injection. Rural residence showed higher percent than urban residence with a statistically significant difference (Table 2). This finding was reinforced by a study done in Canada by Sadowski⁽³⁷⁾. It proclaimed that, the majority of its rural participating elders use multiple forms of NSAIDs. While another study done in the United States by Hanlon⁽³⁵⁾ contradicted the present findings. It reported that, the majority of its urban elders use

combination of NSAIDs forms for physical functional status disability. This contradiction can be explained by this study results where ruralelders used NSAIDs higher than urban elders. In addition to using of these drugs as a form of analgesics. Consequently, the rural residence use multiple forms to relief their pain.⁽³⁷⁾

Unfortunately, the present study exhibits that, more than two thirds of the study subjects experienced side effects as a result of NSAIDs use. Rural residence stated higher percent than urban residence with a statistically significant difference (Table 2). On the same line, a study done in Japan by Sampaio⁽¹³⁾ had found that, the majority of rural users of NSAIDs suffered from drug side effects. On the opposite side, a previous study done in Malaysia by Sulaiman⁽³⁸⁾ had reported that, the side effects of NSAIDs were prevalent in urban than rural residence. This contradiction here may be related to increased use of NSAIDs among rural residence in the present study. In turn, increased possibility for experience of side effects than urban residence.

According to present study results, the highest percent of the study subjects prefer physician as a primary source of NSAIDs information, while very few percent of them preferring a nurse for information. Notwithstanding there is a statistically significant difference between residence area and the primary source of NSAIDs information among current users, rural and urban participants have nearly the same percent in preferring a nurse as a primary source of information. Although, urban participants were significantly higher than rural participants in preferring physician as a primary source of NSAIDs information (Table 3). These findings were confirmed with a study done in the United States by Houser⁽²¹⁾. It revealed that the majority of urban residence prefer physician as

a main source of NSAIDs information and the nurse is the last source of information. While other study done in Malaysia by Sulaiman⁽³⁸⁾ in contrast to the present findings which revealed that, the majority of urban NSAIDs users obtained information about the drug from the nurse. This difference with the present study results may be attributed to the availability and accessibility of health care facilities in urban settings than rural. Therefore, decrease contact with physician among rural participants.

Surprisingly, the present research revealed that the majority of both rural and urban study subjects reported that, they didn't receive any instructions about NSAIDs from the nurse, with no statistically significant difference. (Table 3). This finding was in line with a study done in the United States by Mazzuca⁽³⁹⁾ which asserted that, the instruction of NSAIDs underused in the health care settings by the nurse. While other study was done in the United Kingdom by Jones⁽⁴⁰⁾ contradicted the present finding which revealed that, the nurse had positive role in chronic NSAIDs usage. This contradiction with the present study may be due to that, in developing countries like Egypt, there is a shortage of the qualified community and gerontological nurse for caring of community-dwelling elderly either in home or in institution. In sequence, less qualified nurse deal with elderly with poor level of education regarding medication. Thus, older adults do not have enough knowledge regarding NSAIDs.

In the present study it was found that, the majority of community-dwelling elderly (urban vs. rural) who currently use NSAIDs either prescribed or OTC had hypertension and MI. (Table 4,5). in addition to, the majority of rural participants who use prescribed NSAIDs had renal impairment (Table 5), and there are a statistically significant difference

between both residence in the above contraindications to use NSAIDs. These findings were confirmed with a study done in Australia by Adams⁽⁴¹⁾ which asserted that the higher rate of NSAIDs users was among rural and urban participants suffered from hypertension and MI either was prescribed or OTC. While other study done in Germany by Dorks⁽⁴²⁾ contradicted the present findings which revealed that there was a higher use of prescribed or OTC NSAIDs in rural and urban residence who had renal and gastrointestinal disorders.

Reasons for prescribing NSAIDs in rural and urban participants could be that physicians may be fresh graduates and not had enough experiences to assess contraindications for use of NSAIDs. Using of OTC NSAIDs in both rural and urban residence who had contraindications to use may be related to that, the majority of the present study subjects have lower level of education, live alone and poor level of knowledge regarding NSAIDs. Also, these findings can be justified as that, the majority of them reported that they don't receive any instruction from the nurse. The community-dwelling elderly may be at risk for lower health literacy and decrease awareness of the NSAIDs consequences on their health status.

According to knowledge level, the present study was found that, the majority of the study subjects had poor level of knowledge about NSAIDs. Rural participants were significantly more likely to had poor level of knowledge relative to urban participants (Figure 2). This result agrees with another study done in the United States by Dunn⁽⁴³⁾ which found that, the knowledge regarding NSAIDs is severely lacking, particularly among rural NSAIDs users. While other studies were done in Australia by Adams⁽⁴¹⁾ and in Malaysia by Sulaiman⁽³⁸⁾ contradicted

the present finding which revealed that despite being widely used of NSAIDs, urban elders' knowledge and awareness of the medicines has been poor. This contradiction may be related to the lower educational level among rural participants than urban participants in the present study.

Regarding utilization of NSAIDs among community-dwelling elderly, the present study revealed that, the majority of the study subjects who are females, with lower educational level, being married, living in rural areas and in their own homes with their daughters/sons and have enough income had higher utilization rate of NSAIDs with a statistically significant difference (Table 6). This result was confirmed with a study done in Australia by Henry⁽⁴⁴⁾ which found that, females with lower level of education constitute the majority of NSAIDs users. Also, the present finding are supported with a study done in United Kingdom by Chen⁽⁴⁵⁾ which asserted that, the rural geographical region had significant potential effect in drug utilization with an increasing use of NSAIDs among elderly living in the rural areas. While a previous study done in the United States by Lassila⁽⁴⁶⁾ contradicted the present study findings which revealed that, significantly more men with higher educational level than women were taking NSAIDs. Other study done in Australia by Behan⁽⁴⁷⁾ which contradicted the present findings and revealed that, both urban and rural areas had very high rate of using NSAIDs with no significant difference.

Conclusion:

It can be concluded from the findings of the present study that, the majority of the community dwelling elderly in both rural and urban residence use NSAIDs with higher rate among rural residence. They were significantly more than urban residence in the utilization pattern of NSAIDs without prescription (OTC) for

analgesic reason with multiple forms as tablet, ointment, and injection. Additionally, they reported experience of NSAIDs side effects. Moreover, they have more contraindications to use NSAIDs. Furthermore, the majority of both rural and urban study subjects reported that they don't receive any instructions from the nurse about NSAIDs, with no statistically difference. Also, the majority of the study subjects who are females, with lower educational level, being married, living in rural areas and in their own homes with their daughter/sons and have enough income had higher utilization rate of NSAIDs with a statistically significant difference.

Recommendations:

Based on the findings of the present study, it can be recommended that:

- Community health and gerontological nurses have the responsibility for training the nurses who work in different rural and urban health care settings such as home visit, outpatient clinics, health centers and hospitals. This could be done through educational program about NSAIDs information, contraindications to use, monitoring of effectiveness of the prescribed NSAIDs periodically.
- Increase public awareness through mass media of use of NSAIDs, as more products become available over the counter, the patients should seek professional advice before purchasing OTC NSAIDs and to read the product information leaflets.
- Posters/brochure illustrating the information about the NSAIDs such as indications, contraindications, safe and effective use, side effects and warning signs should be available in all rural and urban health care settings where community dwelling elderly attend.

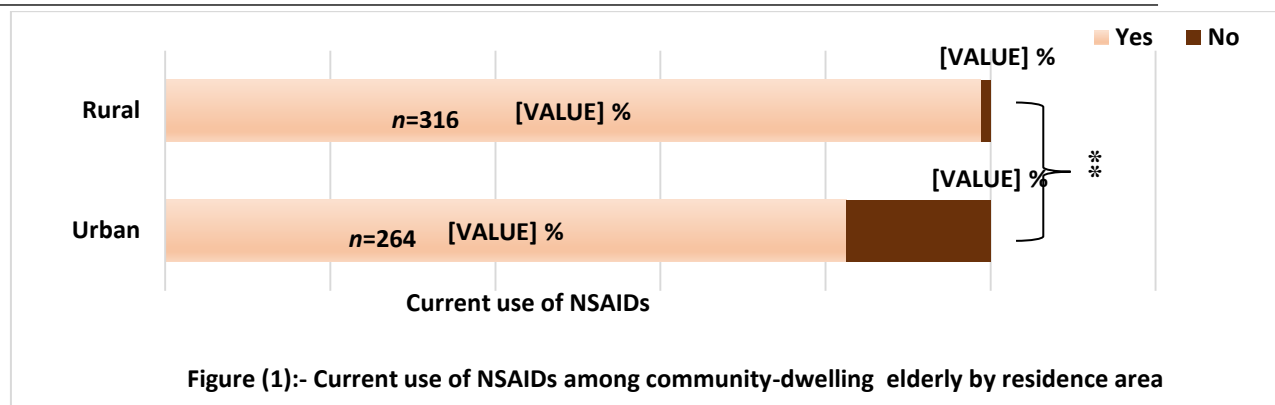
- The nurse should collaborate between multidisciplinary health care providers especially the physician as a primary source of elders' NSAIDs information regarding their medications needs

Recommended future researches:

- Develop health educational program for rural health nurse to improve their knowledge and practice regarding utilization of NSAIDs prescribed and OTC.
- Prepare nursing guideline to Identify the high risk elderly who use NSAIDs
- Survey to identify the prevalence of using OTC drugs medications among elders

Table (1) :- Socio-demographic characteristics of community-dwelling elderly by urban versus rural residence area

Sociodemographic characteristics	Residence						$\chi^2 (P)$
	Urban (n=320)		Rural (n=320)		Total		
	No	%	No	%	No.	%	
Age							
• 60-	184	57.5	220	68.8	404	63.1	10.7 (0.005 ^{**})
• 65-	56	17.5	32	10.0	88	13.8	
• 70+	80	25	68	21.2	148	23.1	
Range: 60-83	66.24±5.26		65.11±5.28		65.68±5.29		
Gender							
• Male	148	46.2	136	42.5	284	44.5	0.9 (0.133)
• Female	172	53.8	184	57.5	356	55.5	
Educational level							
• Illiterate / read & write	148	46.2	252	78.8	400	62.5	100.3 (0.001 ^{**})
• Basic education (primary/preparatory)	104	32.5	36	11.2	140	21.9	
• Secondary education	28	8.8	32	10.0	60	9.4	
• University	28	8.8	0	0	28	4.3	
• Post graduate	12	3.7	0	0	12	1.9	
Occupation							
• Not work	260	81.2	248	77.5	508	79.4	1.3 (0.241)
• Work	60	18.8	72	22.5	132	20.6	
Marital status							
• Married	164	51.2	180	56.2	344	53.8	33.7 (0.001 ^{**})
• Widow-divorced	124	38.8	140	43.8	264	41.2	
• Single	32	10	0	0	32	5.0	
Living arrangement							
• Own home	264	82.5	264	82.5	528	82.5	18.6 (0.001 ^{**})
• Son/daughter home	40	12.5	56	17.5	96	15.0	
• Relative home	16	5	0	0	16	2.5	
Who live with elderly							
• Spouse	88	27.5	112	35	200	31.3	31.2 (0.001 ^{**})
• Daughter/son	160	50	168	52.5	328	51.3	
• Relatives	28	8.7	0	0	28	4.3	
• Spouse, daughter, and son	44	13.8	40	12.5	84	13.1	
Family Income							
• Enough	184	57.5	164	51.3	348	54.3	0.8 (0.363)
• Not Enough	120	37.5	148	46.2	268	41.9	
• Enough & Save	16	5.0	8	2.5	24	3.8	



(**) Statistically significant at $p < 0.01$

Table (2):- Utilization pattern of NSAIDs among current users of drug by residence area

Utilization pattern of NSAIDs	Residence				Total		$\chi^2 (P)$
	Urban (n=264)		Rural (n=316)				
	No.	%	No.	%	No.	%	
Causes of NSAIDs use							
• Anti-inflammatory	36	13.6	20	6.3	56	9.7	13.4 (0.001 ^{**})
• Antipyretics	28	10.6	20	6.3	48	8.3	
• Analgesics	200	75.8	276	87.4	476	82	
Prescription status of NSAIDs use							
• Prescribed	89	33.7	17	5.4	106	18.3	77.3 (0.001 ^{**})
• OTC	175	66.3	299	94.6	474	81.7	
Numbers of NSAIDs are currently taking							
• 1-3	136	51.5	112	35.4	248	42.8	42.8 (0.001 ^{**})
• 4-6	96	36.4	188	59.5	284	49.0	
• 7-9	24	9.1	4	1.3	28	4.8	
• 10 and more	8	3	12	3.8	20	3.4	
Frequency of day per month are taking NSAIDs, during the past month							
• 1 – 7 days/month	4	1.5	0	0	4	0.7	69.1 (0.001 ^{**})
• 8 – 14 days/month	152	57.6	84	26.6	236	40.7	
• 15 – 21 days/month	68	25.8	116	36.7	184	31.7	
• 22 – 30 days/month	40	15.1	116	36.7	156	26.9	
Frequency per day are taking NSAIDs, during the past month							
• 1 time /day	68	25.8	188	59.5	256	44.1	102.2 (0.001 ^{**})
• 2 time /day	112	42.4	48	15.1	160	27.6	
• 3 time /day	72	27.3	40	12.7	112	19.3	
• 4 and more time /day	12	4.5	40	12.7	52	9	
Duration of taking NSAIDs							
• Less than one month	16	6.1	8	2.5	24	4.1	22.9 (0.001 ^{**})
• 1 ≤ 3 month	24	9.1	8	2.5	32	5.5	
• 3 ≤ 6 month	16	6.1	8	2.5	24	4.1	
• 6 Month and more	208	78.8	292	92.5	500	86.3	
Most common forms of NSAIDs use							
• Single route (Ointment, Tablet, Injection)	224	84.8	52	16.5	276	47.6	269.4 (0.001 ^{**})
• More than one route	40	15.2	264	83.5	304	52.4	
Precautions of NSAIDs use							

• Take oral NSAIDs with food and plenty of water [‡]								
– Yes	76	30.6	16	5.5	92	17.0	60.1 (0.001 ^{**})	
• Double dose in case of severe symptom [‡]								
– Yes	220	88.7	80	27.4	300	55.6	204.1 (0.001 ^{**})	
• Hands washing of topical NSAIDs after use [◊]								
– Yes	12	23.1	40	14.5	52	15.9	2.4 (0.120)	
Experience of any side effects as a result of taking NSAIDs								
• Yes	132	50	268	84.8	400	69.0	81.4 (0.001 ^{**})	
• No	132	50	48	15.2	180	31.0		
If yes, Describe the experienced side effects (n=400)								
• Mild side effect	52	39.4	100	37.3	152	38.0	3.9 (0.135)	
• Moderate side effect	68	51.5	124	46.3	192	48.0		
• Severe side effect	12	9.1	44	16.4	56	14.0		

[‡] only tablet users answer this question

[◊] only ointment users answer this question

(^{**}) Statistically significant at $p < 0.01$

Table (3):- Sources of NSAIDs information among currently users by residence area

Variables	Residence						Test value (P value)
	Urban		Rural		Total		
	No.	%	No.	%	No.	%	
Most preferred health care setting when having any health problem (n=580)							
• No	17	6.4	30	9.5	47	8.1	81.7 (0.001 ^{**})
• Governmental settings (hospital/ clinic/ health insurance)	65	24.7	186	58.9	251	43.3	
• Non-governmental settings (hospital/clinic)	182	68.9	100	31.6	282	48.6	
Received instructions about NSAIDs from the nurse[#] (n=533)							
• Yes	5	2.0	10	3.5	15	2.8	1.1 (0.305)
• No	242	98.0	276	96.5	518	97.2	
Primary source of NSAIDs information (n=580)							
• Physician	137	51.9	112	35.4	249	42.9	95.7 (0.001 ^{**})
• Nurse	8	3.0	12	3.8	20	3.5	
• Pharmacist	97	36.7	54	17.1	151	26.0	
• Family/relatives	22	8.4	138	43.7	160	27.6	

[#] This question for only elders who preferred health care setting when having any health problem

(^{**}) Statistically significant at $p < 0.01$

Table (4) :- Contraindications to use NSAIDs among currently users by residence area

Contraindications to use NSAIDs [#]	Older adults who currently use NSAIDs (n=580)						χ^2 (P)
	Urban		Rural		Total		
	No	%	No	%	No	%	
Previous history of stroke	72	27.3	92	29.1	164	28.3	240 (0.624)
Previous history of heart attack	68	28.8	116	36.7	184	31.7	7.9 (0.005**)
Previous history of peptic ulcer/GIT bleeding	56	21.2	248	78.5	304	52.4	189.1 (0.001**)
Previous history of renal impairment	68	25.8	260	82.3	328	56.6	187.1 (0.001**)
Having liver cirrhosis	48	18.2	128	40.5	176	30.3	33.9 (0.001**)
Having bronchial asthma	96	36.4	160	50.6	256	44.1	11.8 (0.001**)
Having Myocardial Infarction (MI)	228	86.4	196	62.0	424	73.1	43.3 (0.001**)
Having Congestive Heart Failure (CHF)	128	48.5	148	46.8	276	47.6	0.1 (0.692)
Having uncontrolled hypertension	200	75.8	296	93.7	496	85.5	37.2 (0.001**)
using anti-coagulant drugs	112	42.4	172	54.4	284	49	8.2 (0.001**)
using corticosteroids drugs	40	15.2	176	55.7	216	37.2	101.1 (0.001**)
using antidepressant drugs	20	7.6	60	19.0	80	13.8	15.7 (0.001**)
Undergoing recent CABG	20	7.6	24	7.6	44	7.6	0.1 (0.993)

[#] Multiple response question(**) Statistically significant at $p < 0.01$

Table (5) :- Contraindications to use NSAIDs among currently users according to their prescription status (prescribed or over the counter) by residence area

Contraindications to use NSAIDs [#]	Prescription of NSAIDs (n=580)												X ² (P)	
	Prescribed (n=106)						Test value (P value)	Over-The Counter (OTC) (n=474)						
	Urban		Rural		Total			Urban		Rural		Total		
No	%	No	%	No	%	No	%	No	%	No	%	No	%	
Previous history of stroke	24	27.0	10	58.8	34	32.1	X ² = 6.6 p= 0.01*	48	27.4	82	27.4	130	27.4	0.1 (0.999)
Previous history of heart attack	22	24.7	8	47.1	30	28.3	FEP = 0.079	46	26.3	108	36.1	154	32.5	4.8 (0.993)
Previous history of peptic ulcer-GIT bleeding	19	21.3	15	88.2	34	32.1	X ² =29.3 p<0.001**	37	21.1	233	77.9	270	57	145.1 (0.001**)
Previous history of renal impairment	16	18.0	16	94.1	32	30.2	X ² = 39.2 p<0.001**	52	29.7	244	81.6	296	62.4	126.7 (0.001**)
Having liver cirrhosis	12	13.5	9	52.9	21	19.8	FEP <0.001**	36	20.6	119	39.8	155	32.7	18.5 (0.001**)
Having bronchial asthma	33	37.1	7	41.2	40	37.7	X ² =0.1 p = 0.749	63	36.0	153	51.2	216	45.6	10.2 (0.001**)
Having Myocardial Infarction (MI)	74	83.1	10	58.8	84	79.2	FEP =0.04*	154	88.0	186	62.2	340	71.7	36.2 (0.001**)
Having Congestive Heart Failure (CHF)	43	48.3	9	52.9	52	49.1	X ² = 0.1 p= 0.727	85	48.6	139	46.5	224	47.3	0.1 (661)
Having uncontrolled hypertension	64	71.9	16	94.1	80	75.5	FEP =0.06	136	77.7	280	93.6	416	87.8	26.1 (0.001**)
using anti-coagulant drugs	44	49.4	7	41.2	51	48.1	X ² = 0.3 p= 0.532	68	38.9	165	55.2	233	49.2	11.7 (0.001**)
using corticosteroids drugs	15	16.9	12	70.6	27	25.5	FEP<0.001**	25	14.3	164	54.8	189	39.9	75.7 (0.001**)
using antidepressant drugs	6	6.7	5	29.4	11	10.4	FEP = 0.015*	14	8.0	55	18.4	69	14.6	11.7 (0.002**)
Undergoing recent CABG	10	11.2	6	35.3	16	15.1	FEP = 0.021*	10	5.7	18	6.0	28	5.9	0.1 (0.892)

[#] Multiple response question

FEP: Fisher's Exact significance test

(**) Statistically significant at p<0.01

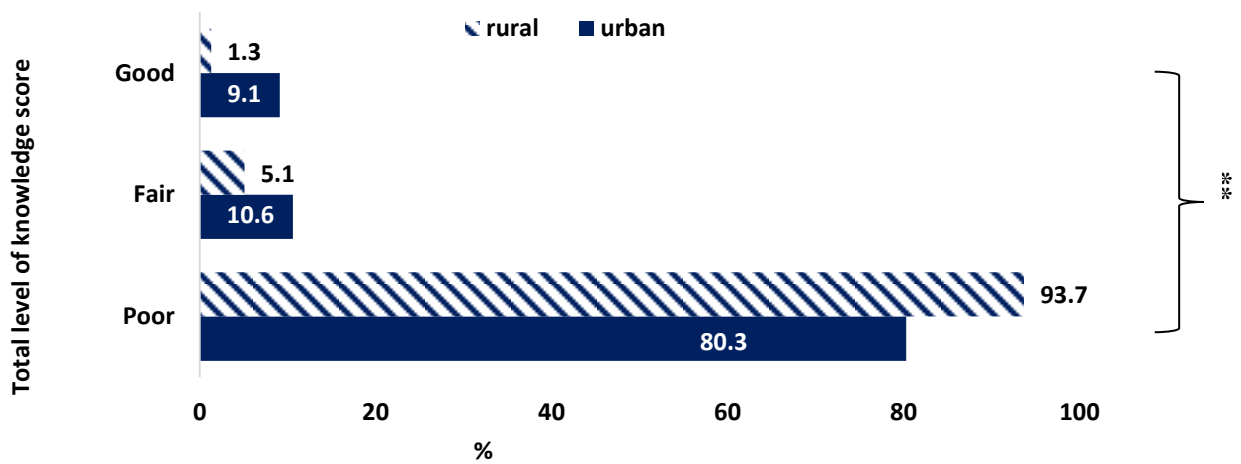


Figure (2):- Total level of knowledge score about NSAIDs among currently users by residence area

(**) Statistically significant at $p < 0.01$

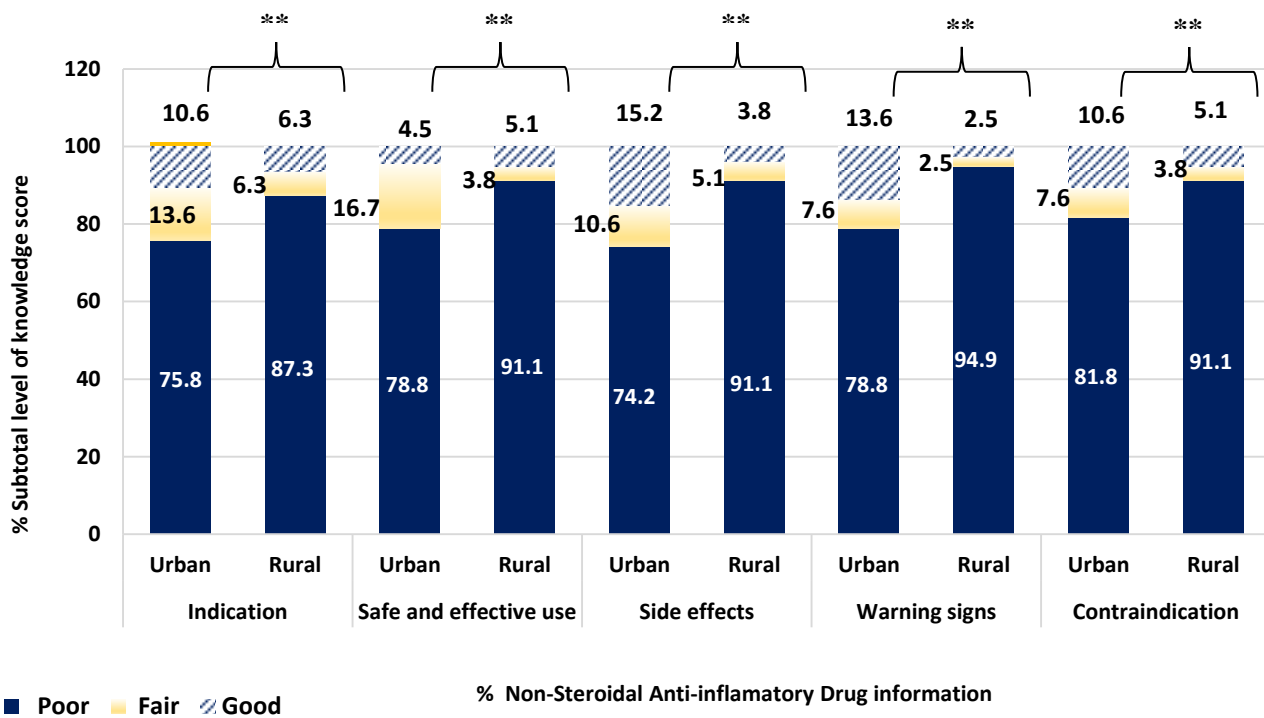


Figure (3):- Subtotal level of knowledge score about NSAIDs among currently users by residence area

(**) Statistically significant at $p < 0.01$

Table (6) Relation between socio-demographic data of the community-dwelling elderly and their current use of NSAIDs

Socio-demographic characteristics	Current use of NSAIDs						χ^2 (P)	
	Yes (n=580)		No (n=60)		Total (n=640)			
	No	%	No	%	No	%		
Age in years	60-	272	63.4%	24	60.0%	404	63.1%	3.8 (0.144)
	65-	180	14.5%	16	6.7%	88	13.8%	
	70+	128	22.1%	20	33.3%	148	23.1%	
Gender	Male	268	46.2%	16	26.7%	284	44.4%	8.4 (0.004**)
	Female	312	53.8%	44	73.3%	356	55.6%	
Educational level	Illiterate – read & write	368	63.4%	32	53.3%	400	62.5%	16.3 (0.003**)
	Basic education (primary/preparatory)	120	20.7%	20	33.3%	140	21.9%	
	secondary education	56	9.7%	4	6.7%	60	9.4%	
	University	28	4.8%	0	0.0%	28	4.4%	
Occupation	Postgraduate	8	1.4%	4	6.7%	12	1.9%	0.1 (0.900)
	Not work	460	79.3%	48	80.0%	508	79.4%	
Marital status	Work	120	20.7%	12	20.0%	132	20.6%	26.4 (0.001**)
	Married	300	51.7%	44	73.3%	344	53.8%	
	Widow-divorced	256	44.1%	8	13.3%	264	41.2%	
Residence	Single	24	4.1%	8	13.3%	32	5.0%	49.7 (0.001**)
	Rural	316	54.5%	4	6.7%	320	50.0%	
Living arrangement	Urban	264	45.5%	56	93.3%	320	50.0%	5.6 (0.059*)
	Own home	472	81.4%	56	93.3%	528	82.5%	
	Son/daughter home	92	15.9%	4	6.7%	96	15.0%	
Who lives with elderly	Relative home	16	2.8%	0	0.0%	16	2.5%	9.5 (0.023*)
	Spouse	172	29.7%	28	46.7%	200	31.2%	
	Daughter/son	304	52.4%	24	40.0%	328	51.2%	
	Relatives	28	4.8%	0	0.0%	28	4.4%	
Family income	Spouse, daughter, and son	76	13.1%	8	13.3%	84	13.1%	17.3 (0.001**)
	Enough	316	54.5%	32	53.3%	348	54.4%	
	Not Enough	248	42.8%	20	33.3%	268	41.9%	
	Enough & Save	16	2.8%	8	13.3%	24	3.8%	

(*) Statistically significant at $p < 0.05$ (**) Statistically significant at $p < 0.01$

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