journal homepage: http://kont.zsf.jcu.cz
DOI: 10.32725/kont.2024.049

KONTAKT / Journal of nursing and social sciences related to health and illness

Original research article

# Italian nursing students' knowledge of Atrial Fibrillation: A cross-sectional study

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**Abstract**
*Background:* Early recognition, prevention, and treatment of complications are key aspects of nursing care planning for people with Atrial Fibrillation (AF). However, recent studies suggest that nurses' knowledge of AF is only sometimes accurate. No studies are currently available in Italy.
*Aim:* To study nursing students' knowledge of Atrial Fibrillation in an Italian setting.
*Methods:* A multicentre cross-sectional study was conducted in a population of nursing students from three Italian universities during the 2022/2023 academic year. The validity and reliability of the Italian version of the Atrial Fibrillation Knowledge Assessment Tool (AFKAT-ita) were investigated.
*Results:* 246 students (response rate 73.21%) were enrolled. The total of correct answers was Me = 18 IQR [16; 19] (theoretical range 0–21). The number of correct answers increased with age ($p < 0.001$), year of the course advances ($p < 0.001$), and in those who had direct contact with people with AF during their clinical experience ($p < 0.001$). The Content Validity Index (S-CVI) of the AFKAT-ita was 92.10, the Cronbach's alpha coefficient was 0.695, and McDonald's ω was 0.726.
*Conclusion:* Overall, students showed a moderate level of knowledge. These results provide an initial overview of the knowledge of AF in Italian nursing students; in-depth studies are desirable. The psychometric properties of the AFKAT-ita confirm it as a valid and reliable tool for assessing AF knowledge.

**Keywords:** Atrial Fibrillation (AF); Knowledge; Nursing; Students

## Introduction

Atrial Fibrillation (AF) is the most widespread and clinically relevant cardiac arrhythmia (Zimetbaum, 2017). It is a clinical condition classified as a supraventricular tachyarrhythmia and is characterised by chaotic and irregular atrial electrical activity, which causes loss of the mechanical function of atrial contraction (Li et al., 2020). It is not unusual to find completely asymptomatic cases of AF that are detected by coincidence during a clinical visit or when an ECG is analysed (McCallum et al., 2019). Some individuals present with symptoms such as palpitations, breathlessness, intolerance to exercise, chest pain, and fatigue; symptoms that are mainly experienced by individuals who already have an underlying heart condition (Li et al., 2020).

Despite progress in medicine, AF is responsible for 15% of all ischaemic events; it is one of the leading causes of heart disease worldwide, as well as dementia, and is associated with an increased risk of all-cause mortality (Hindricks et al., 2021; Krijthe et al., 2013). In 2010, it was estimated that 20.9 million men and 12.6 million women worldwide had AF, with both incidence and prevalence rates being higher in developed countries. The prevalence is higher in older persons and in individuals with conditions such as high blood pressure, heart failure, coronary artery disease, valvulopathy, obesity, diabetes mellitus, and chronic renal failure (Hindricks et al., 2021). The demographic transformation that Europe is now experiencing, the increase in predisposing factors and better diagnostic techniques for detecting silent AF will make this arrhythmia increasingly present in the future (Gourraud et al., 2018; Krijthe et al., 2013). By 2030, there will be 14–17 million people with

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http://doi.org/10.32725/kont.2024.049
Submitted: 2024-07-01 • Accepted: 2024-09-13 • Prepublished online: 2024-10-23
KONTAKT 26/4: 327–332 • EISSN 1804-7122 • ISSN 1212-4117

AF in the European Union, with 120,000 to 215,000 new diagnoses per year (Hindricks et al., 2021). Italian data suggest an increase in cases from 1.1 million today to 1.9 million in 2060 (Di Carlo et al., 2019).

The described scenario indicates the magnitude of the phenomenon and its growing impact from a clinical, organisational, and economic point of view for healthcare facilities worldwide (Krijthe et al., 2013). It also highlights the need to identify and treat AF subjects at an earlier stage, which is a key step in preventing AF-related complications (Bao et al., 2022). A delay in starting treatment or an inadequate therapeutic adherence associated with limited knowledge of AF (Li et al., 2022; McCabe et al., 2016; Patsiou et al., 2022) may be related to an increased risk of heart failure and, above all, stroke (Arauz et al., 2022; McCabe et al., 2017). Early recognition, detection of risk factors, prevention, and treatment of complications are key aspects of nursing care planning for a person with AF (Chen et al., 2021; Mousa and Dawood, 2022). For this reason, the correct knowledge and interpretation of cardiac rhythms are currently integrated into university education in several countries (ANMAC, 2019; Habibzadeh et al., 2019; NMC, 2018). Similarly, in the Italian academic setting, education in cardiology is also integrated into the core nursing curriculum. Despite this, recent studies (Ferguson et al., 2016; Omoush et al., 2022) have shown that nurses' knowledge of AF still needs improvement. Italian research has yet to be conducted to explore students' effective knowledge.

### *Aim*

This study aimed to investigate the knowledge of Bachelor of Science in Nursing students regarding Atrial Fibrillation in different Italian universities.

## Materials and methods

### *Design*

A descriptive, cross-sectional, multicentre study was carried out.

### *Setting*

The research was conducted by involving nursing degree course students from the following universities:

- University of Milan La Statale, San Paolo Bachelor School of Nursing (UniMi);
- the University of Foggia, Barletta-Andria-Trani Bachelor School of Nursing (UniFg);
- University of Rome La Sapienza, Policlinico Umberto I Bachelor School of Nursing (UniRoma – La Sapienza).

### *Sample characteristics*

Participants included students at the beginning of the course of study (1st year), at the start of the second year, at the beginning of the third year, and graduating students at the end of the third year.

Because this is one of the few studies that analysed students' knowledge of Atrial Fibrillation, we calculated post-hoc statistical power. To at least hypothesize the number of subjects needed for this research, we considered the papers by Chen et al. (2021), which included 114 students in the final year of their undergraduate course in Nursing.

Based on their findings, we initially hypothesized that we would involve at least 200 students. Post-hoc power analysis on our sample revealed an actual power of all statistical tests between 83% and 85%, which can be considered satisfactory.

### *Data collection procedures*

Data were collected during October 2022, at the beginning of the 2022/2023 academic year. The questionnaire was administered through a weblink; the students received the request for participation in their university mailbox. The document was composed of an information sheet with an informed consent form for participation, a section on the socio-demographic and academic data of the participant, and the AFKAT-ita scale for assessing AF knowledge (Table 1).

### *The tool*

The Atrial Fibrillation Knowledge Assessment Tool (AFKAT) scale was developed in 2020 by Jatau Abubakar et al. (2020) to assess knowledge levels on atrial fibrillation in healthcare providers and the general population. The domains investigated by the tool include knowledge about atrial fibrillation, risk factors, diagnosis, and management of the arrhythmia. The scale consists of 21 items. For each item, two options are available: 'true' or 'false'. Each answer is scored 1 if correct or 0 if incorrect. The final score produced by the total of all answers, ranges from 0 (no correct answer) to 21 (all correct answers).

Before receiving approval from the original author, a linguistic and cultural adaptation was carried out through English-Italian back translation. This was performed independently by two nurses, one holding a C2 language certification. The two translations were then compared to achieve the final Italian version back-translated by a native English-speaking teacher. The original author judged the definitively prepared version, confirming that it was correct and identical to the original.

Next, the principal psychometric tests required by a validation process were conducted: the scale in its original version consisting of 21 items was administered to 5 expert nurses (professional experience of more than ten years and a Master's degree in Nursing) to assess its face validity and content validity. Each expert was given a form including information regarding the purpose of the study and the instrument translated; for each item they were requested to evaluate the relevance by assigning a score ranging from 1 ("totally irrelevant") to 4 ("totally relevant"). This allowed the calculation of the Content Validity Index of every single item (I-CVI) and the Content Validity Index of the overall scale (S-CVI); following the literature, scores of I-CVI ≥ 0.80 and S-CVI ≥ 0.90 (Polit and Beck, 2006).

An additional open-ended query was set up to allow the assessor to provide any comments regarding the requirement to add further aspects not included in the scale items and to provide an overall judgement regarding its completeness. Any suggestions for amendment were included in the translated scale that was resubmitted to the five experts for overall judgment.

### *Statistical analysis*

Continuous variables were described with medians and quartiles, as they were not normally distributed (Shapiro–Wilk test: $p < 0.05$ for all analyses). They were compared with the groups using Mann–Whitney's $U$ tests (in the case of two-level categorical variables) and Kruskal–Wallis with pairwise comparisons (variables with more than two levels). The correlation was assessed with Spearman's rho coefficient. Categorical variables were described with frequencies. Internal consistency was tested by calculating Cronbach's alpha coefficient and McDonald's omega. The significance threshold for all analyses was set at 5%. Calculations were performed with R version 4 for MacOS.

| Table 1. Italian (AFKAT-ita) and English versions of Atrial Fibrillation Knowledge Assessment Tool | |
|---|---|
| 1. Atrial fibrillation is a medical condition where the heart beats slower than normal<br>La fibrillazione atrial è una condizione medica in cui il cuore batte più lentamente del normale | FALSE |
| 2. Atrial fibrillation may cause blood clots in the heart<br>La fibrillazione atriale può causare la formazione di coaguli di sangue nel cuore | TRUE |
| 3. Episodes of atrial fibrillation are predictable<br>Gli episodi di fibrillazione atriale sono prevedibili | FALSE |
| 4. People with atrial fibrillation can still have an active life<br>Le persone con fibrillazione atriale possono ancora avere una vita attiva | TRUE |
| 5. Atrial fibrillation can only be treated with surgery<br>La fibrillazione atriale può essere trattata solo con la chirurgia | FALSE |
| 6. Episodes of atrial fibrillation can be recurrent<br>Gli episodi di fibrillazione atriale possono essere ricorrenti | TRUE |
| 7. Early diagnosis and management of atrial fibrillation can prevent stroke<br>La diagnosi e la gestione precoce della fibrillazione atriale possono prevenire l'ictus | TRUE |
| 8. Low blood pressure increases the risk of developing atrial fibrillation<br>La bassa pressione sanguigna aumenta il rischio di insorgenza della fibrillazione atriale | FALSE |
| 9. Atrial fibrillation significantly increases the risk of stroke<br>La fibrillazione atriale aumenta significativamente il rischio di ictus | TRUE |
| 10. Atrial fibrillation occurs only in people with prior signs of heart disease<br>La fibrillazione atriale si verifica solo in persone con precedenti segni di patologia cardiaca | FALSE |
| 11. Shortness of breath and fainting can be potential symptoms of atrial fibrillation<br>La mancanza di respiro e lo svenimento possono essere sintomi potenziali di fibrillazione atriale | TRUE |
| 12. Atrial fibrillation occurs only in old age<br>La fibrillazione atriale si verifica solo in età avanzata | FALSE |
| 13. Someone could have atrial fibrillation without having any symptoms<br>Una persona può avere la fibrillazione atriale senza avere alcun sintomo | TRUE |
| 14. Symptoms of atrial fibrillation may be occasional, persistent, or permanent<br>I sintomi della fibrillazione atriale possono essere occasionali, persistenti o permanenti | TRUE |
| 15. Atrial fibrillation usually has major psychological effects on people's lives<br>La fibrillazione atriale ha di solito effetti psicologici importanti sulla vita delle persone | FALSE |
| 16. The risk of developing atrial fibrillation can be reduced with lifestyle changes<br>Il rischio di sviluppare la fibrillazione atriale può essere ridotto modificando lo stile di vita | TRUE |
| 17. Atrial fibrillation can be detected by checking the regularity of the pulse<br>La fibrillazione atriale può essere rilevata controllando la regolarità del polso | TRUE |
| 18. Screening for atrial fibrillation is safe<br>Lo screening della fibrillazione atriale è affidabile | TRUE |
| 19. Once present, atrial fibrillation is always a lifelong condition<br>Una volta presente, la fibrillazione atriale è una condizione che dura tutta la vita | FALSE |
| 20. Atrial fibrillation can be treated with medications<br>La fibrillazione atriale può essere trattata con terapie farmacologiche | TRUE |
| 21. Anticoagulants ("blood thinners") are often used to reduce the risk of stroke in people with atrial fibrillation<br>Gli anticoagulanti ("fluidificanti del sangue") sono spesso utilizzati per ridurre il rischio di ictus nelle persone con fibrillazione atriale | TRUE |

### *Ethical considerations*

The research was conducted following the Helsinki guidelines. Data were collected anonymously and treated under the current Italian legislation. Participants provided their explicit consent to participate, which is mandatory for accessing and filling in the questionnaire. The required authorisations were obtained from the heads of the degree courses involved.

## Results

### *Sample demography*

246 students out of 336 (73.21%) answered the survey, 173 were female (70.33%), and 68 were male (27.64%). The sample age was Me = 22 [21; 24] years (min 19, max 44). 87 students (35.37%) attended the degree course at the University of Milan, 90 (36.59%) at the University of Foggia, and 69 (28.05%) at the University of Rome – La Sapienza. At each university involved, the response rate was over 70%. 94 students (38.21%) reported having known people suffering from Atrial Fibrillation during their clinical internship experiences. Table 2 summarises the demographic and academic characteristics of the sample.

### *Validation of the AFKAT-ita*

All 21 items of the Italian version of the Atrial Fibrillation Knowledge Assessment Tool (AFKAT-ita) scored an I-CVI > 0.80; no experts involved required tool modifications. The

**Table 2. Sample characteristics**

| | *n* | % |
|---|---|---|
| Gender | | |
| Female | 173 | 70.33 |
| Male | 68 | 27.64 |
| Other/no answer | 5 | 2.03 |
| University | | |
| UniFg | 90 | 36.59 |
| UniMi | 87 | 35.37 |
| UniRoma – La Sapienza | 69 | 28.05 |
| Year | | |
| First | 78 | 31.71 |
| Second | 61 | 24.80 |
| Third | 62 | 25.20 |
| Third undergraduate | 45 | 18.29 |
| Having known people with AF | | |
| Yes | 94 | 38.21 |
| No | 66 | 26.83 |
| Do not know/do not remember | 17 | 6.91 |
| No internship | 69 | 28.05 |

S-CVI was 92.10%; all items were considered clear, suitable, and understandable. Cronbach's alpha coefficient was 0.695, and McDonald's omega was 0.726 (still above 0.710 when eliminating items one at a time).

### *AFKAT-ita scores, sociodemographics, and academic characteristics*

The total of correct answers provided by the sample was Me = 18 [16; 19] (min 7, max 21). Table 3 shows the percentage of correct answers for each question; as observed, the items with the lowest correct answer percentages (<75%) were items 8, 15, 17, and 19.

The AFKAT-ita scores were related to the socio-demographic and academic variables of the sample (age, year of course, gender, university, encounter with AF sufferers during clinical internship). The number of correct answers increased with age (rho = 0.385, $p < 0.001$). Third-year undergraduates gave the highest number of correct answers (Me = 19 [19; 20]). Overall, the number of correct responses increases as the year of the course advances ($p < 0.001$). Gender showed no significant differences between females Me = 18, IQR [17; 19] and males 17 [15; 18] ($p = 0.082$); the 6 participants who declared "other gender" reported a score of Me = 18, IQR [16; 18.5].

The university also yielded no significant differences in the sample's median scores ($p = 0.447$), whereas the number of correct answers differed depending on having contact with AF patients during clinical internship experiences. The highest scores were obtained by those who had direct contact with such persons during their clinical experience, while those who had not yet had clinical placements at the moment of the investigation obtained the worst scores ($p < 0.001$) (Table 4).

**Table 3. Right answers for each item of the AFKAT-ita**

| | Right answers *n* (%) | | | | |
|---|---|---|---|---|---|
| Item | Total | First year (*n* = 78) | Second year (*n* = 61) | Third year (*n* = 62) | Graduating (*n* = 45) |
| 1. | 215 (87.40) | 62 (79.49) | 52 (85.25) | 58 (93.55) | 43 (95.56) |
| 2. | 209 (84.96) | 60 (76.92) | 50 (81.97) | 57 (91.94) | 42 (93.33) |
| 3. | 186 (75.61) | 48 (61.54) | 44 (72.13) | 54 (87.10) | 40 (88.89) |
| 4. | 215 (87.40) | 62 (79.49) | 52 (85.25) | 58 (93.55) | 43 (95.56) |
| 5. | 227 (92.28) | 65 (83.33) | 56 (91.80) | 61 (98.39) | 45 (100.0) |
| 6. | 218 (88.62) | 63 (80.77) | 52 (85.25) | 59 (95.16) | 44 (97.78) |
| 7. | 216 (87.80) | 62 (79.49) | 52 (85.25) | 58 (93.55) | 44 (97.78) |
| 8. | 180 (73.17) | 45 (57.69) | 42 (68.85) | 53 (85.49) | 40 (88.89) |
| 9. | 212 (86.18) | 58 (74.36) | 51 (83.61) | 59 (95.16) | 44 (97.78) |
| 10. | 208 (84.55) | 59 (75.64) | 50 (81.97) | 57 (91.94) | 42 (93.33) |
| 11. | 214 (86.99) | 61 (78.21) | 52 (85.25) | 58 (93.55) | 43 (95.56) |
| 12. | 216 (87.80) | 62 (79.49) | 52 (85.25) | 58 (93.55) | 44 (97.78) |
| 13. | 194 (78.86) | 52 (66.67) | 46 (75.41) | 55 (88.71) | 41 (91.11) |
| 14. | 223 (90.65) | 63 (80.77) | 54 (88.52) | 61 (98.39) | 45 (100.0) |
| 15. | 79 (32.11) | 14 (17.95) | 14 (22.95) | 29 (46.77) | 22 (48.89) |
| 16. | 212 (86.18) | 59 (75.64) | 51 (83.61) | 59 (95.16) | 43 (95.56) |
| 17. | 172 (69.92) | 42 (53.85) | 39 (63.93) | 52 (83.87) | 39 (86.67) |
| 18. | 202 (82.11) | 55 (70.51) | 48 (78.69) | 57 (91.94) | 42 (93.33) |
| 19. | 150 (60.98) | 37 (47.44) | 34 (55.74) | 45 (72.58) | 34 (75.56) |
| 20. | 230 (93.50) | 67 (85.90) | 57 (93.44) | 61 (98.39) | 45 (100.0) |
| 21. | 226 (91.87) | 65 (83.33) | 55 (90.16) | 61 (98.39) | 45 (100.0) |

**Table 4. AFKAT-ita scores and sample characteristics**

| | AFKAT-ita scores | | |
|---|---|---|---|
| | Me | IQR | *P* |
| Gender | | | |
| Male | 17 | 15; 19 | 0.082 |
| Female | 18 | 16; 19 | |
| University | | | |
| UniMi | 18 | 16; 19 | 0.447 |
| UniRoma | 17.5 | 14; 18.5 | |
| UniFg | 18 | 17; 18.5 | |
| Year | | | |
| First | 14 | 12; 17 | |
| Second | 18 | 17; 19 | **<0.001** |
| Third | 19 | 17; 20 | |
| Graduating | 19 | 19; 20 | |
| Having known people with AF | | | |
| Yes | 19 | 18; 19 | |
| No | 17 | 17; 18 | **<0.001** |
| Do not know/do not remember | 17 | 17; 18 | |
| No internship | 14 | 12; 16 | |

## Discussion

The increasing incidence of atrial fibrillation worldwide (Lippi et al., 2021) will gradually impact the decision-making and planning of healthcare and social care institutions. The first step to strongly address this issue is to improve the knowledge of healthcare professionals, particularly nurses, who are frequently the primary personnel to contact patients suffering from this condition in various clinical settings. Despite this, no studies are available in Italy that survey the level of knowledge of nursing students on this tachyarrhythmia. The few studies performed internationally agree on the existence of knowledge gaps, not only in the students but also in the nurses.

Our results indicate a moderate knowledge of this tachyarrhythmia: the median number of correct answers provided by the responders was 18, IQR [16; 19], with 15 out of 21 items showing an accurate response rate of more than 80%. By stratifying the whole sample by course year, first-year students showed a low level of knowledge of this pathology (Me = 14, IQR [12; 17]). This finding seems consistent with the specific period of training during which the instrument was administered: at the time of the survey, the students were at the beginning of their academic career at the school of nursing and, therefore, they had not yet had the opportunity to attend lectures in the Anatomy and Physiology course and, in particular, to learn about atrial fibrillation. The low level of knowledge that emerged would not, therefore, be due to problems in teaching or learning or, again, ascribable, in general, to university training. On the other hand, the substantial increase ($p < 0.001$) in the median number of correct answers related to the progression of the academic course suggests the effectiveness of the educational program. From this perspective, it is not surprising that the highest scores were obtained by third-year students (Me = 19, IQR [18; 20]) and undergraduates (Me = 19. IQR [17; 19]) who are now approaching the beginning of their professional career. The absence of significant differences in the students' scores in the different Degree Course sites supports the idea that the curricula, despite the University autonomy provided for by the regulations in force, are standardised throughout the national territory. Of course, this assumption will have to be confirmed on a larger sample involving a greater number of universities and in different areas of the Italian nation.

Finally, it is unsurprising that the level of knowledge increases with age (and therefore with the progression of the academic course) and with direct experience during the internship. Concerning this latter aspect, the higher number of correct answers provided by students who had contact with AF patients (Me = 19, IQR [18; 19]) suggests that clinical practice improves the knowledge previously achieved through theoretical education. Concerning the scores for the single items of the AFKAT-ita, those that showed the lowest rates of correct answers were item 15 and item 19. Atrial fibrillation is often accompanied by psychological and physical effects (item 15) that have been extensively documented in the literature (Ladwig et al., 2020; Son et al., 2019; Taylor et., 2022). These negatively affect the quality of life and also exert greater pressure on informal caregivers (Kanters et al., 2021). The fact that around 68% of the sample answered incorrectly suggests the need to consolidate this aspect during theoretical training. A similar conclusion can be reached concerning the results obtained from item 19, "once present, atrial fibrillation is a lifelong condition", to which approximately 60% answered correctly, which contrasts with the very good results obtained from item 14 ("symptoms of atrial fibrillation may be occasional, persistent, or permanent") where around 90% of the students seem to have a clear understanding of the classification of AF. Thus, the secondary aim of this investigation was to preliminarily test the psychometric properties of the Italian version of the Atrial Fibrillation Knowledge Assessment Tool (AFKAT-ita). The values of the Content Validity Index (S-CVI), Cronbach's alpha, and McDonald's omega confirmed satisfactory content validity and internal consistency of the scale.

This study has several limitations. First, theoretical knowledge on the subject of AF was investigated: no tests were carried out on the students' effective ability to interpret an electrocardiogram, nor was their ability to perform the care management of an AF case investigated. On the theoretical front, the students demonstrated a fair degree of knowledge. However, practical knowledge during simulation courses or in real-life situations needs to be explored to obtain overall data on students' knowledge. Furthermore, it would have been useful to expand the sample dimension by extending the investigation to nursing school students in other Italian areas to provide a more complete representation of the Italian setting. Finally, the psychometric tests carried out are promising, but the validation process cannot be considered complete. Further analyses are recommended to investigate the validity and reliability of the AFKAT-ita in more detail.

## Conclusion

To the best of our knowledge, before this research, no studies had been conducted in Italy to investigate nursing students' understanding of AF. For this reason, the obtained results are undoubtedly of interest because they provide an initial overview of the knowledge in the student population.

Our findings have implications for university education, research, and nursing practice. They could contribute to refining and updating university curricula, through the introduction of active teaching and practical activities aimed at improving nursing students' knowledge of atrial fibrillation. To this purpose, active and innovative learning strategies, such

as clinical virtual simulation could be used to facilitate knowledge retention and clinical reasoning.

The validation process of the AFKAT-ita, albeit preliminary, now makes available to healthcare professionals and training systems a valid tool that, as the original author reported, can be used to investigate this topic in different populations of healthcare professionals and the general population.

### *Data availability*

Data supporting the findings of this paper are available from the corresponding author upon reasonable request.

### *Ethical aspects and conflict of interest*

The authors have no conflict of interest to declare.

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