ORIGINAL PAPER

Forensic Nursing Science

Knowledge of child abuse and neglect in nursing students: Assessment and perspectives

Francesco Lupariello MD ⬥ | Giuliana Mattioda MD | Giancarlo Di Vella MD, PhD

Dipartimento di Scienze della Sanità Pubblica e Pediatriche, Sezione di Medicina Legale, Università degli Studi di Torino, Turin, Italy

Correspondence

Francesco Lupariello, Dipartimento di Scienze della Sanità Pubblica e Pediatriche, Sezione di Medicina Legale, Università degli Studi di Torino, Corso Galileo Galilei 22, 10126 Turin, Italy.
Email: francesco.lupariello@unito.it

Abstract

Misdiagnosis of child abuse and neglect can delay early treatment. Some authors have pointed out that nurses can miss child abuse and neglect diagnoses due to a lack of knowledge. It is unclear whether the lack of knowledge is due to students' insufficient preparation in nursing school and/or a deficiency in continuing education. An 18-item questionnaire was administered to final-year nursing students to assess their degree of knowledge on child abuse and neglect and to evaluate if the lack of knowledge was due to insufficient teaching/training during nursing school. The students were also asked to evaluate themselves by assigning a score to their knowledge. A statistical comparison was performed to define whether sufficient/insufficient results were associated with the following variables: sex, pediatric or general nursing student, attending pediatric lectures, training in pediatric wards/ambulatories, and attending specific lectures on child abuse and neglect. The study population comprised 175 students (154 females, 20 males, 1 unknown). Exactly 66.3% of the participants had ≤9/18 correct answers. Of all students, 77.7% self-evaluated their level of knowledge as ≤5/10. The comparisons yielded statistically significant differences between the groups with sufficient objective knowledge and those unrelated to training in pediatric wards/ambulatories or pediatric nursing students. Overall, there was little objective knowledge on the subject, which may be related to insufficient teaching/training in nursing schools. Useful corrective strategies include further teaching on child abuse and neglect, preferably using a practical approach. Further, common teaching/training programs should be conducted by both pediatric and general nursing schools.

KEYWORDS

child abuse and neglect, continuing education, corrective strategies, forensic nursing, knowledge, nurse, nursing school, prevention, violence against children

Highlights

- Nurses can miss child abuse and neglect due to a lack of knowledge.
- Lack of knowledge may be due to insufficient preparation during nursing school.
- Nursing students seemed to be highly aware of this knowledge deficit.
- This study highlights the need to improve nursing school training programs.

1 | INTRODUCTION

According to the 29th Report of the Children's Bureau, child abuse and neglect are widespread. In the United States Child Protective Service Agencies, more than 4 million referrals for suspected child maltreatment occurred in 2018, involving approximately 7.8 million children [1].

Even though child abuse and neglect are associated with significant morbidity and mortality [2], it is often unreported. Identifying child abuse and neglect is particularly difficult for healthcare providers. Child abuse and neglect can vary widely in severity, type, outcome, and chronicity, resulting in challenging diagnoses [3].

Misdiagnosis caused by poor or inadequate knowledge of child abuse can delay early treatment leading to chronic psychiatric and medical disorders [4]. In this case, incorrect information may be reported to judicial authorities, causing legal issues in civil, juvenile, family, divorce, and criminal courts [5–7].

Few studies have explored healthcare providers' ability to correctly identify signs, symptoms, and factors suspicious of child abuse and neglect. Some authors have pointed out that due to a lack of knowledge, nurses can miss the red flags of child abuse and neglect, attributing them to natural conditions and/or accidental traumas [8]. The lack of education and training in these healthcare workers can result in a failure to protect children.

The scientific literature does not clarify whether the above-mentioned knowledge deficit is due to insufficient preparation of students in nursing schools and/or a deficiency in continuing education after graduation, and few studies have been conducted on this topic. Additionally, no extensive suggestions have been provided regarding possible corrective approaches to compensate for this deficiency.

Consequently, in this study, we administered a questionnaire to final-year nursing students to assess their knowledge about child abuse and neglect, evaluate whether the lack of knowledge is due to insufficient teaching/training during nursing school, and identify corrective strategies.

2 | MATERIALS AND METHODS

To evaluate knowledge on child abuse and neglect, an 18-item questionnaire was anonymously (the authors did not know which students completed the questionnaire) administered to final-year nursing students at the University of Turin (Italy) (Table 1). Ethical approval was waived for this research by the University Review Board because the study was not interventive and was completely anonymized at the origin. It is important to note that there are two types of nursing programs in Italy: general and pediatric. At the beginning of the first year of nursing school, students are required to choose either a general or pediatric program. Although the general program is not centered on pediatrics, it also contains some lectures/training

TABLE 1 Questionnaire results with the numbers and percentages of correct/incorrect answers.

1. Which is the most widespread form of child abuse and neglect?
   a. physical abuse—2 (1.1%)
   b. **neglect—12 (6.9%)**
   c. sexual abuse—11 (6.3%)
   d. psychological abuse—10 (5.7%)
   e. mixed forms—139 (79.4%)

2. All are normal anatomical variations of the prepubertal hymen, except for one answer, which is not an existing type of hymenal morphology:
   a. annular hymen—35 (20%)
   b. **hymen with high convexity—25 (14.3%)**
   c. imperforate hymen—39 (22.3%)
   d. septate hymen—39 (22.3%)
   e. crescentic hymen—32 (18.3%)

3. In case of suspected sexual abuse, the physical examination of the anogenital area:
   a. is usually decisive since suggestive lesions are frequently found—46 (26.3%)
   b. is usually not performed since there are no suggestive lesions—0
   c. **is usually performed in combination with vulva swabs—94 (53.7%)**
   d. does not include the examination of the hymen—9 (5.1%)
   e. is usually performed in association with the steric evaluation of the impact of the suspected tool—25 (14.3%)

4. Referring to physical examination in a case of suspected sexual abuse (choose the wrong answer):
   a. the oropharynx must be analyzed in association with the evaluation of the genital area—11 (6.3%)
   b. **it is essential to focus only on the genital area to reduce the time of the visit as much as possible—100 (57.1%)**
   c. it should report the state of mind and attitude of the minor—14 (8%)
   d. it is necessary to evaluate the presence of neglect signs—15 (8.6%)
   e. must be supplemented with photos—34 (19.4%)

5. Which of the following signs of child sexual abuse (even if rare) would be more likely to still be visible after 20 days?
   a. edema—8 (4.6%)
   b. abrasions—24 (13.7%)
   c. abrasion—22 (12.6%)
   d. anal folds—8 (4.6%)
   e. **deep perineal lacerations—111 (63.4%)**

6. Which of the following can be more likely interpreted as a sign of CSA?
   a. urethral prolapse—37 (21.1%)
   b. vulvar lichen—34 (19.4%)
   c. vulvar ulcer—21 (12%)
   d. perianal skin appendages—20 (11.4%)
   e. **posterior fourchette's scar—54 (30.9%)**

7. Which of the following infections is more likely associated with transmission through sexual contact?
   a. **Trichomonas vaginalis—24 (13.7%)**
   b. Herpes simplex virus type I e II—68 (38.9%)
   c. Molluscum contagiosum—8 (4.6%)
   d. Lichen sclerosus—3 (1.7%)
   e. Candida albicans—71 (40.6%)

TABLE 1 (Continued)

8. Which of the following signs/lesions can be more likely caused by a trauma that occurred during accidental/playful activities?

   a. multiple fractures—11 (6.3%)
   b. ecchymoses in different stages of healing—8 (4.6%)
   c. periorbital ecchymoses—14 (8%)
   d. ecchymosis in a 6-month-old—15 (8.6%)
   e. **a lacerated-contused wound of the hand's palmar surface—126 (72%)**

9. Which of the following is typically associated with not-accidental burns:

   a. **clear demarcation between intact skin and damaged skin—81 (46.3%)**
   b. second-degree burns—4 (2.3%)
   c. upper extremity burns—9 (5.1%)
   d. neck burns—32 (18.3%)
   e. scattering and "water splash" burns– 46 (26.3%)

10. Which of the following findings should always be checked in a case of non-accidental head trauma?

    a. inner ear hemorrhage—41 (23.4%)
    b. **retinal hemorrhage—53 (30.3%)**
    c. external ear hemorrhage—17 (9.7%)
    d. epistaxis—22 (12.6%)
    e. eardrum hemorrhage—41 (23.4%)

11. All the following fractures can be considered highly suspicious for physical abuse in infants, except for [10]:

    a. rib fractures—8 (4.6%)
    b. sternal fractures—15 (8.6%)
    c. scapular fractures—24 (13.7%)
    d. vertebral spinous process fractures—25 (14.3%)
    e. **greenstick fractures of the diaphysis of a long bone—100 (57.1%)**

12. According to the scientific literature [10], during infancy which fractures can be considered highly suspicious for physical abuse?

    a. vertebral bodies fractures—15 (8.6%)
    b. linear skull fractures—26 (14.9%)
    c. **posterior ribs fractures—52 (29.7%)**
    d. two or more linear skull fractures—49 (28%)
    e. clavicle fractures—30 (17.1%)

13. All these conditions/signs can be considered red flags of abuse, except for:

    a. delay in accessing care—16 (9.1%)
    b. **multiple excoriations on the anterior tibial surface—112 (64%)**
    c. contradictory case history—15 (8.6%)
    d. injuries in non-ambulatory children—17 (9.7%)
    e. buttocks multiple bruises—13 (7.4%)

14. Which is the more likely definition of neglect?

    a. **the failure to provide a child's development in health, education, emotional development, nutrition, shelter and secure living conditions, considering family or caregivers resources—113 (64.6%)**
    b. the emotional relationship characterized by repeated and continuous psychological pressure, emotional blackmail, indifference, rejection, denigration, and devaluations that damage or inhibit the development of fundamental cognitive-emotional skills such as intelligence, attention, perception, memory—40 (22.9%)
    c. the involvement of the minor in acts of violence against significant reference figures for the child—2 (1.1%)
    d. the involvement of a minor in sexual acts, with or without physical contact—5 (2.9%)
    e. the intentional use of physical violence against a minor that causes or has a high probability of causing damage to health, survival, development, or dignity, such as assault, corporal punishment, or serious attacks on the physical integrity or the life of the child/adolescent—12 (6.9%)

TABLE 1 (Continued)

15. Which of the following conditions is not an example of neglect?

    a. accidental intake of psychotropic substances by a not-ambulatory child—13 (7.4%)
    b. dental neglect—15 (8.6%)
    c. non-adherence to medical prescriptions—5 (2.9%)
    d. **excoriations on knees and anterior tibial surfaces—136 (77.7%)**
    e. poor hygiene—6 (3.4%)

16. Which investigation should be performed in case of suspicious chronic exposure to toxic substances in a child?

    a. **hair analysis—96 (54.9%)**
    b. blood analysis—36 (20.6%)
    c. urine analysis—38 (21.7%)
    d. saliva analysis—2 (1.1%)
    e. bone marrow analysis—2 (1.1%)

17. These are considered risk factors for carelessness, except:

    a. parental depression—8 (4.6%)
    b. parental substance abuse—6 (3.4%)
    c. family abuse—4 (2.3%)
    d. parents young age—119 (68%)
    e. **parental separation—37 (21.1%)**

18. Childhood neglect is associated with a high risk of developing these neuropsychiatric disorders, except for:

    a. chronic pain syndrome—30 (17.1%)
    b. anxiety disorders and depression—6 (3.4%)
    c. self-harm and suicidal attempts—7 (4%)
    d. **autism—127 (72.6%)**
    e. personality disorders—2 (1.1%)

Note: Correct answers are in bold; Questions 1, 3, 4, 7, 8, 10, 16, 17—one student did not answer; Question 2—five students did not answer; Questions 5, 13—two students did not answer; Question 6—nine students did not answer; Questions 9, 11, 12, 14, 18—three students did not answer.

in pediatrics because in Italy both general and pediatric nurses can work in pediatric wards/hospitals, ambulatories, and healthcare settings. Therefore, we extended the questionnaire to both types of students from the same university.

This questionnaire was developed and administered in Italian. The manuscript has been translated into English for publication. It was based on a questionnaire administered to Italian medical students, as described in another publication by Lupariello et al. [9]. However, the authors did not use the same questions as those in the aforementioned publication. The questions were tailored to the specific profiles of nursing students because the medical students' questionnaire was considered unsuitable for properly assessing nursing students' objective knowledge. The questionnaire was developed by the first and last authors of the present manuscript (FL and GD), who are physicians specializing in the forensic sciences. Particularly, they are experts on child abuse and neglect who have worked for many years at the ambulatory center of the University Pediatric Hospital of Turin (Italy), which is dedicated to the diagnosis, treatment, and management of violence against children. The questionnaire was created following indications in the scientific literature on physical maltreatment, sexual abuse, and neglect of children [3, 10–14]. To validate the questionnaire, two nurses (experts in child abuse and neglect fields) were asked to answer all questions, ascertaining that the

questions effectively captured the topic under investigation. They also checked the survey for double-barreled and confusing questions. The authors conducted a pilot test on a subset of the intended population (15 nursing students who were not included in the study). The pilot test results were checked for errors caused by systematic erroneous interpretations of questions/answers (particularly negatively phrased questions). The final version of the questionnaire was created after the validation process. All the above mentioned procedures were carried out in Italian because it was the native language of the authors, nurses, and nursing students.

The study population comprised 175 students. The first question tested the students' knowledge of child abuse and neglect epidemiology (Table 1). Questions 2–7 focused on child sexual abuse (CSA) (Table 1). Questions 8–13 evaluated the students' awareness of physical maltreatment in children (Table 1). Questions (#14–18) were focused on neglect (Table 1). All questions were characterized by five multiple-choice answers (only one was correct). Students' knowledge was considered sufficient if they correctly answered more than 50% of the 18 questions (final score > 9/18). This allowed us to divide the population into two groups: Group A students with sufficient (>9/18) objective knowledge and Group B students with insufficient objective knowledge (≤9/18).

Additionally, in the last part of the questionnaire (after the abovementioned 18 questions), the students were asked to answer this question: "What score (from 1 to 10 points) would you assign to your knowledge of child abuse and neglect?" By comparing the results of this answer with those of the 18 aforementioned questions,

the authors aimed to understand whether nursing students had high or low self-awareness of their level of knowledge (Figure 1).

The questionnaire also contained questions that allowed us to divide the population according to the following variables (see Table 2): sex, pediatric or general nursing students, attended pediatric lectures, training in pediatric wards/ambulatories, and attended specific lectures on child abuse and neglect. Statistical analyses were then carried out to compare Groups A and B with all the above mentioned variables (sex, pediatric or general nursing student, attended pediatric lectures, training in pediatric wards/ambulatories, and attended specific lectures about child abuse and neglect).

The mean and standard deviation of the final scores of the 18-item questionnaire were calculated. Variable distributions were compared using the chi-squared test (when the expected value for each cell was five or higher) and Fisher's exact test (when the expected value for each cell was less than five). For all tests, the significance level was set at $\alpha = 0.001$.

IBM SPSS Statistic software (version 25) was used for statistical analyses.

3 | RESULTS

The main results are reported in Tables 1, 2, and 3. "The population size included 175 students (the response rate was 100%; the participants were solicited during nursing school lectures): 154 females (88%), 20 males (11.4%), and 0 in the other category (one student
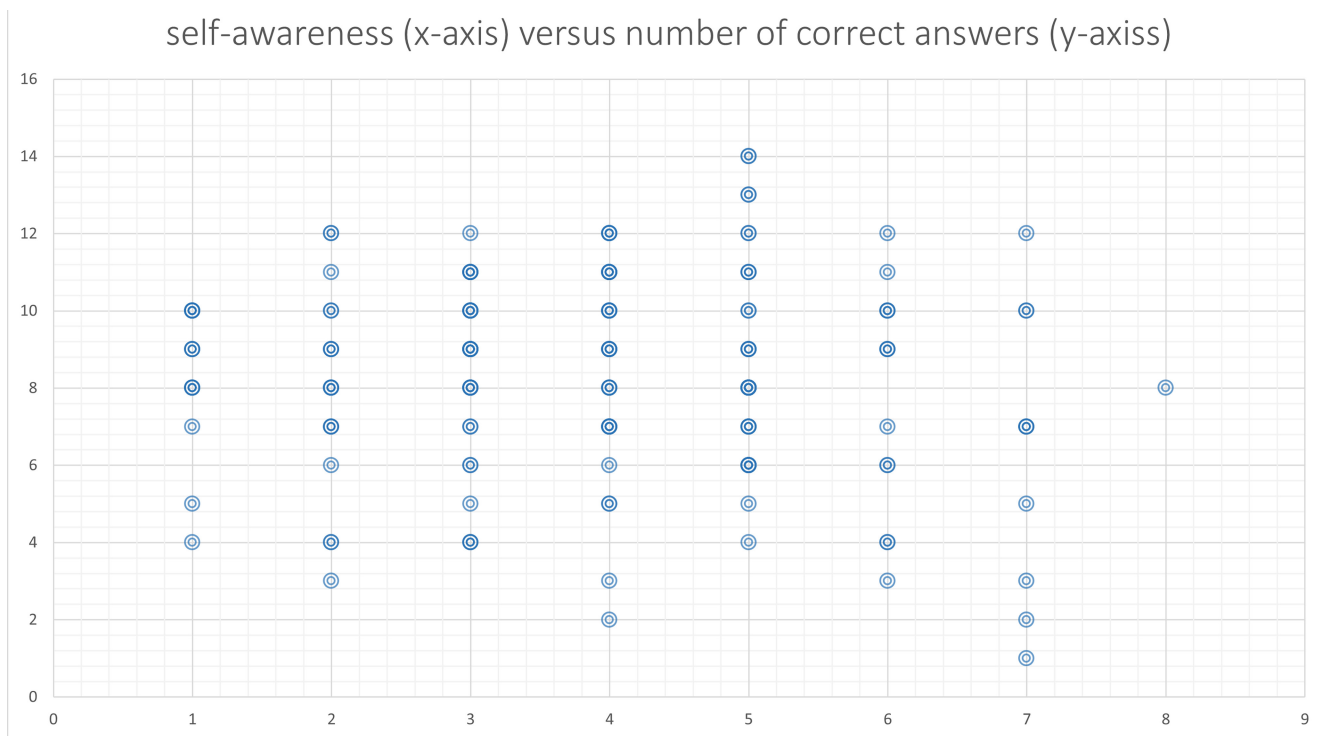
FIGURE 1 Graphical representation of students' self-awareness of their level of knowledge (x-axis, from 1 to 10 points) versus number of correct answers (y-axis). Four students did not answer the question "What score (from 1 to 10 points) would you assign to your knowledge of child abuse and neglect?" Thus, they are not depicted in this figure.

TABLE 2 Distribution of nursing students based on selected variables.

	Number of students with sufficient (>9/18) objective knowledge	Number of students with insufficient (≤9/18) objective knowledge
Females	54	100
Males	5	15
Attended pediatric lectures—no	8	31
Attended pediatric lectures—yes	51	83
Attended specific lectures on child abuse and neglect—no	44	86
Attended specific lectures on child abuse and neglect—yes	15	28
Training in pediatric wards/ ambulatories—no	39	104
Training in pediatric wards/ ambulatories—yes	20	11
General nursing students	43	109
Pediatric nursing students	16	7

Note: One student did not provide information about the following variables: sex and training in pediatric wards/ambulatories. Two students did not provide information about the variables: attended pediatric lectures, attended specific lectures on child abuse and neglect.

did not answer). Of all students, 66.3% scored ≤9/18, demonstrating insufficient knowledge (Group B). The mean and standard deviation of the scores of the 18-item questionnaire was 8.34 ± 2.49. Students demonstrated high self-awareness of their low level of knowledge, as 77.7% of all students assigned a score of ≤5/10 the question," What score (from 1 to 10 points) would you assign to your knowledge of child abuse and neglect?" (Figure 1). Exactly 23 students attended pediatric nursing schools (13.1%), and 152 attended general nursing schools. In total, 134 students (76.6%) attended pediatric lectures, 17.7% (31 students) attended training in pediatric wards/ambulatories, and 43 students (24.6%) reported attending specific lectures on child abuse and neglect (see Table 2 for distributions of the variables).

Statistical comparisons (chi-squared and Fisher tests) yielded statistically significant differences ($p < 0.001$) between Group A (sufficient objective knowledge) and Group B (insufficient objective knowledge) with the following variables: training in pediatric wards/

ambulatories and pediatric or general nursing students (Table 3). In contrast, the statistical analysis did not yield statistically significant results (p-value ≥ 0.001) for sex, attended pediatric lectures, and attended specific lectures on child abuse and neglect (Table 3).

4 | DISCUSSION

4.1 | Analysis of questionnaire results

The results showed an overall negative outcome for most students (66.3%). In 3/18 questions (#1, #2, and #7), ≤15% answered correctly. In the other 4/18 questions (#6, #10, #12, and #17), correct answers were above 15% but ≤35%.

Particularly, most incorrect answers were in the questionnaire section that explored nursing students' knowledge of CSA (questions #2–#7). The students' awareness of a child's hymenal anatomy was particularly deficient. Only 14.3% recognized that high convexity is not an anatomical variation in the morphology of the hymen (question #2). Furthermore, only 13.7% correctly indicated which infection was most likely to be associated with sexual intercourse (Question 7). The analysis indicated a slightly higher number of correct answers for question 6 (30.9%); nevertheless, 69.1% did not know that a scar on the posterior fourchette could be a sign of CSA [3]. Furthermore, even if the correct answers to question #3 were above 50%, 46.3% of all nursing students were unaware of the importance of performing vulvar swabs when examining the anogenital area in cases of suspected CSA.

Regarding the section dedicated to physical abuse (questions #8–#13), the nursing students had better results compared to the CSA section. In no questions, correct answers were ≤15%. However, the students showed poor (percentages >15% and ≤35%) knowledge of which typical finding is associated with abusive head trauma (question #10) and the significance of posterior rib fractures in non-ambulatory children (question #12) [10].

The section where the study population showed better knowledge was neglect (questions 14–18). The students only demonstrated an insufficient awareness of the risk factors associated with child neglect in question #17. However, the nursing students failed to correctly answer the first epidemiological question (Question 1). Only 6.9% correctly answered that neglect was the most common [11].

In light of the above, it is possible to state that there was overall low objective knowledge of child abuse and neglect in this population.

4.2 | Comparison with other studies about students' knowledge in other countries

We reviewed the scientific literature (PubMed and Scopus databases) to identify other studies that evaluated nursing students' knowledge using questionnaires/surveys. This review yielded a few

TABLE 3 Results of statistical comparisons.

Variable 1	Variable 2	Results of chi-squared/fisher tests	p-value
Sufficient (>9/18)/insufficient (≤9/18) objective knowledge	Sex (male, female, other)	1.314	$p \geq 0.001$ (0.518)
Sufficient (>9/18)/insufficient (≤9/18) objective knowledge	Attended pediatric lectures (yes, no)	5.191	$p \geq 0.001$ (0.075)
Sufficient (>9/18)/insufficient (≤9/18) objective knowledge	Attended specific lectures on child abuse and neglect (yes, no)	1.045	$p \geq 0.001$ (0.593)
Sufficient (>9/18)/insufficient (≤9/18) objective knowledge	Training in pediatric wards/ambulatories (yes, no)	16.325	$p < 0.001$ (0.0005)
Sufficient (>9/18)/insufficient (≤9/18) objective knowledge	Pediatric or general nursing students	15.230	$p < 0.001$ (0.0005)

studies. In one of them, Pisimisi et al. assessed the knowledge and attitude of a Greek population [8]. However, a direct comparison of the results of the two studies is not possible because Pisimisi et al.'s questions, especially those referring to specific knowledge on this topic, differed from those of this study. Particularly, they asked nursing students to self-rate their awareness of child abuse and neglect using a 5-point Likert scale. Therefore, their analysis was based on self-reported (subjective) knowledge [8]. However, in this study, we aimed to evaluate objective knowledge using multiple-choice questions. In this study, students were asked to self-score their subjective awareness of their competence only in the final part of the analysis. Thus, the methodologies used in the two studies were significantly different. Furthermore, unlike the study by Pisimisi et al., this study evaluated only final-year students. This strategy was chosen because the aim was to objectively determine the specific knowledge of students who were almost leaving nursing school to work as healthcare providers. Similar considerations were suggested by Poreddi et al. [15]. The questionnaire was distributed to second-, third-, and fourth-year nursing students at a college in Bangalore (South India). The researchers evaluated students' objective knowledge of child abuse and neglect. However, the results of their questions cannot be directly compared with our results because they focused on different topics, and each question was not associated with multiple-choice answers but with only three possible responses (yes, no, not sure).

In light of the above, articles analyzing nursing students' knowledge of child abuse and neglect are hardly comparable due to different study designs. Despite these differences, all the aforementioned articles pointed out the following common result: nursing students from different countries demonstrated similar unsatisfactory levels of knowledge about child abuse and neglect [8, 15].

The aforementioned results seem to be a recurring finding in other (few) available studies in which the knowledge/attitudes of other healthcare professional students were analyzed. In 2022, a study from the same university as the present study was published, reporting that medical students lack objective knowledge [9]. In addition to different methodologies, similar considerations were proposed in 2018 by Kong et al., who evaluated the clinical performance of medical students [16]. In 2021, Al-Ani et al. pointed out that dental students in Hamburg (Germany) had inadequate knowledge about child abuse and neglect [17].

4.3 | New frontiers and perspectives

It is important to note that the questions used in this study were chosen based on the baseline knowledge of child abuse and neglect. Even if not specifically specialized in this field, every nurse should possess the minimum skills to identify signs/symptoms/factors associated with abuse. Nurses are often the first healthcare providers with whom children and/or family members interact. Sometimes nurses are the only available healthcare providers, especially in places where children spend significant amounts of time. Thus, especially in the case of physical maltreatment and/or neglect, whose effects can be more easily observed, nurses can play a pivotal role in identifying signs of abuse. Some authors have reported the importance of school nurses in the healthcare of children in schools, highlighting their role in cases of suspected child abuse and neglect. Harding et al. conducted a review highlighting the importance of correctly identifying suspected cases and supporting children and families [18]. Jack et al. (2021) proposed similar considerations regarding nurses' activities during home visits. They concluded by stating that

"public health nurses working in targeted, long-term home visitation programs have a unique role and responsibility with respect to preventing, considering, and then safely recognizing and responding to suspected child maltreatment" [19].

Even though healthcare providers' role in preventing and recognizing child abuse and neglect is pivotal, several studies have reported that worldwide, there is a gap in their knowledge of this topic [20–22]. Frequently, they are unfamiliar with the main (physical and behavioral) signs of abuse in children and caregivers. This can negatively influence outcomes. Many authors have highlighted the severe acute and chronic consequences of misdiagnosis [23, 24]. If the chain of abusive events is not curbed by the appropriate intervention of healthcare providers, it can result in new abusive episodes that could potentially be life-threatening. Additionally, the long-term negative consequences on children are well known: low educational achievement, low-skilled employment, mental health issues, attempted suicide, drug/alcohol dependence, obesity, chronic pain in adulthood, and intergenerational transmission of child maltreatment [23, 24]. Thus, misdiagnosing child abuse and neglect can generate significant social and economic burdens for society in the long term.

In light of the above, it is clear that for each country/society, one strategy to prevent and limit the abovementioned negative outcomes is to have skilled healthcare providers. Subsequently, in recent years, many authors have highlighted the importance of continuing education and training in child abuse and neglect for healthcare providers. This approach can improve skills [20–22].

Nevertheless, are we sure this is the only option available to healthcare providers with in-depth knowledge of child abuse and neglect? For highly skilled nurses, should we rely only on post-degree continuing education and training?

This study clearly indicates that the lack of adequate teaching/training in nursing schools is a possible cause of inadequate knowledge among professional nurses. As mentioned previously, there are few studies on this topic in the scientific literature [8, 9, 15–17]. The available studies seem to agree that the origin of poor knowledge can be related to insufficient training in schools [8, 9, 16, 17]. Thus, a new (and imperative) preventive strategy to identify child abuse and neglect should also rely on implementing the basics in teaching and practical training in nursing schools.

The present analysis also highlighted that students are highly aware of their deficiencies. Indeed, 77.7% of students self-evaluated their knowledge of child abuse and neglect from 1/10 to 5/10 points. This negative datum can be considered a positive starting point because students, aware of the negative consequences of a knowledge deficit, could be more prone to deepen their knowledge if more extensive school programs are provided.

Regarding the types of activities that should be implemented in school programs, the statistical analysis in this study demonstrates the importance of developing practical skills. The statistical comparison revealed that students who had taken part in practical child-care training had better results. In contrast, no statistical differences were observed when considering lectures on pediatrics. A practical approach to pediatrics can result in better-skilled students. Thus,

even if lectures are useful, these data suggest that a practical approach is preferred for improving school programs.

The statistical evaluation also suggested another meaningful result: pediatric nursing students showed better results than those who studied general nursing. This result is not surprising because this type of education targets students who intend to work only in pediatric settings. However, this lack of knowledge among general nurses is a significant weakness because they may be employed in healthcare settings where children are patients. Thus, different competencies in child abuse and neglect between pediatric and general nurses is not a rational methodology because it goes against what usually occurs in practical routines. Thus, we suggest that teaching/training about child abuse and neglect should be implemented in both pediatric and general programs. This approach can align the care provided to children across all settings.

In light of the above, all nursing schools should focus on developing and supporting specific programs that deal with child abuse and neglect. To achieve this goal, each nursing school should first define its current ability to train its students using questionnaires similar to those proposed in this manuscript. Then, the same questionnaire should be used to assess which specific subjects should be implemented, including additional lectures and practical training where healthcare providers experienced in those subjects should be involved. Additionally, all schools should reassess the same students after implementing the aforementioned training program to verify whether the program was fruitful.

The scientific literature lacks specific information on preferred methodologies that should be used to teach child abuse and neglect. Recently, Giannakas et al. conducted an interesting study in which they proposed a participatory approach for medical students [25]. Particularly, they created a workshop on role-playing using manikin and peer-to-peer teaching. This methodology could also be used for nursing students, as the study demonstrated that this approach improved participants' knowledge and self-confidence in child abuse and neglect [25].

4.4 | Limitations

The main limitation of this study is the difficulty in generalizing the results to other geographical regions or countries, as our findings may reflect the organization of the specific educational system where it was conducted.

However, a comparison of different healthcare school professional systems suggests similar issues in student knowledge of child abuse and neglect worldwide [26–28]. For example, the World Health Organization and the International Association of Medical Regulatory Authorities have suggested the need for common criteria for medical school accreditation [26–28]. In the United States, "the responsibility for curriculum development rests with the medical school and is not specifically dictated by accrediting bodies" [29]. In Italy (as in many European countries), for both medical and nursing schools, accreditation relies on offices that depend on the Ministry

of Instruction and University [26–28]. Nevertheless, these offices do not define the specific content of the student curriculum, which is developed by the school directors. For these reasons, it appears that in the United States, Italy, and many European countries, the child protection curriculum varies depending on the leadership and capacity of each school [29]. Thus, all systems—in which teaching programs on child abuse and neglect for nursing students are not uniform—are at risk of not fulfilling the mandate to protect children from abusive events. The main risk is graduating nursing students who are not uniformly trained, not only between different countries but also between different geographical areas of the same country.

Further research is required to better identify the level of knowledge worldwide, allowing for the identification of useful preventive strategies. Future studies using similar methodologies should be conducted by researchers from different geographical areas and countries to enable direct comparisons of the results.

5 | CONCLUSIONS

This study revealed the overall low objective knowledge of child abuse and neglect among a population of nursing students, which was related to insufficient teaching/training in nursing schools. We propose the following corrective strategies: training should rely on teaching basics in nursing schools, a practical approach is advised to improve nursing school programs, and common teaching/training programs on child abuse and neglect should be implemented in both pediatric and general nursing programs.

CONFLICT OF INTEREST STATEMENT
The authors have no conflict of interest.

ORCID
Francesco Lupariello https://orcid.org/0000-0003-2264-8521

REFERENCES

1. The Administration for Children and Families. Child maltreatment. https://www.acf.hhs.gov/cb/data-research/child-maltreatment. Accessed 27 Feb 2023.
2. Schilling S, Christian CW. Child physical abuse and neglect. Child Adolesc Psychiatr Clin N Am. 2014;23(2):309–19. https://doi.org/10.1016/J.CHC.2014.01.001
3. Adams JA, Farst KJ, Kellogg ND. Interpretation of medical findings in suspected child sexual abuse: an update for 2018. J Pediatr Adolesc Gynecol. 2018;31(3):225–31. https://doi.org/10.1016/J.JPAG.2017.12.011
4. Nemeroff CB. Paradise lost: the neurobiological and clinical consequences of child abuse and neglect. Neuron. 2016;89(5):892–909. https://doi.org/10.1016/J.NEURON.2016.01.019
5. AAP Committee on Child Abuse and Neglect. Guidelines for the evaluation of sexual abuse of children: subject review. Pediatrics. 1999;103(1):186–91. https://doi.org/10.1542/PEDS.103.1.186
6. Makoroff KL, Brauley JL, Brandner AM, Myers PA, Shapiro RA. Genital examinations for alleged sexual abuse of prepubertal girls: findings by pediatric emergency medicine physicians compared with child abuse trained physicians. Child Abus Negl.
7. Lupariello F, Coppo E, Cavecchia I, Bosco C, Bonaccurso L, Urbino A, et al. Differential diagnosis between physical maltreatment and cupping practices in a suspected child abuse case. Forensic Sci Med Pathol. 2020;16(1):188–90. https://doi.org/10.1007/s12024-019-00155-w
8. Pisimisi DC, Syrinoglou PA, Sinopidis X, Karatza A, Lagadinou M, Soldatou A, et al. Knowledge and attitudes of medical and nursing students in Greece regarding child abuse and neglect. Child (Basel). 2022;9(12):1978. https://doi.org/10.3390/CHILDREN9121978
9. Lupariello F, Capello F, Grossi V, Bonci C, Di Vella G. Child abuse and neglect: are future medical doctors prepared? Leg Med (Tokyo). 2022;58:102100. https://doi.org/10.1016/J.LEGALMED.2022.102100
10. Flaherty EG, Perez-Rossello JM, Levine MA, Hennrikus WL. Evaluating children with fractures for child physical abuse. Pediatrics. 2014;133(2):e477–89. https://doi.org/10.1542/peds.2013-3793
11. Stoltenborgh M, Bakermans-Kranenburg MJ, van Ijzendoorn MH. The neglect of child neglect: a meta-analytic review of the prevalence of neglect. Soc Psychiatry Psychiatr Epidemiol. 2013;48(3):345–55. https://doi.org/10.1007/S00127-012-0549-Y
12. Tsokos M. Diagnostic criteria for cutaneous injuries in child abuse: classification, findings, and interpretation. Forensic Sci Med Pathol. 2015;11(2):235–42. https://doi.org/10.1007/S12024-015-9671-Y
13. Feld K, Ricken T, Feld D, Helmus J, Hahnemann M, Schenkl S, et al. Fractures and skin lesions in pediatric abusive head trauma: a forensic multi-center study. Int J Leg Med. 2022;136(2):591–601. https://doi.org/10.1007/S00414-021-02751-4
14. Collier ZJ, Roughton MC, Gottlieb LJ. Negligent and inflicted burns in children. Clin Plast Surg. 2017;44(3):467–77. https://doi.org/10.1016/J.CPS.2017.02.022
15. Poreddi V, Pashapu DR, Kathyayani BV, Gandhi S, El-Arousy W, Math SB. Nursing students' knowledge of child abuse and neglect in India. Br J Nurs. 2016;25(5):264–8. https://doi.org/10.12968/BJON.2016.25.5.264
16. Kong HH, Im S, Seo JH, Kim DK, Roh HR. Medical students' clinical performance of dealing with patients in the context of domestic violence. Korean J Med Educ. 2018;30(1):31–40. https://doi.org/10.3946/KJME.2018.79
17. Al-Ani A, Hashim R, Schiffner U, Splieth CH. Child physical abuse: knowledge of dental students in Hamburg, Germany. Eur Arch Paediatr Dent. 2021;22(6):1057–65. https://doi.org/10.1007/S40368-021-00651-0
18. Harding L, Davison-Fischer J, Bekaert S, Appleton JV. The role of the school nurse in protecting children and young people from maltreatment: an integrative review of the literature. Int J Nurs Stud. 2019;92:60–72. https://doi.org/10.1016/J.IJNURSTU.2018.12.017
19. Jack SM, Gonzalez A, Marcellus L, Tonmyr L, Varcoe C, van Borek N, et al. Public health nurses' professional practices to prevent, recognize, and respond to suspected child maltreatment in home visiting: an interpretive descriptive study. Glob Qual Nurs Res. 2021;8:2333393621993450. https://doi.org/10.1177/2333393621993450
20. Flaherty EG, Sege R, Price LL, Christoffel KK, Norton DP, O'Connor KG. Pediatrician characteristics associated with child abuse identification and reporting: results from a national survey of pediatricians. Child Maltreat. 2006;11(4):361–9. https://doi.org/10.1177/1077559506292287
21. Li X, Yue Q, Wang S, Wang H, Jiang J, Gong L, et al. Knowledge, attitudes, and behaviours of healthcare professionals regarding child maltreatment in China. Child Care Health Dev. 2017;43(6):869–75. https://doi.org/10.1111/CCH.12503
22. Schweitzer RD, Buckley L, Harnett P, Loxton NJ. Predictors of failure by medical practitioners to report suspected child abuse

2002;26(12):1235–42. https://doi.org/10.1016/S0145-2134(02)00419-2

in Queensland, Australia. Aust Health Rev. 2006;30(3):298–304. https://doi.org/10.1071/AH060298

23. Gilbert R, Widom CS, Browne K, Fergusson D, Webb E, Janson S. Burden and consequences of child maltreatment in high-income countries. Lancet (London, England). 2009;373(9657):68–81. https://doi.org/10.1016/S0140-6736(08)61706-7

24. Pears KC, Capaldi DM. Intergenerational transmission of abuse: a two-generational prospective study of an at-risk sample. Child Abuse Negl. 2001;25(11):1439–61. https://doi.org/10.1016/S0145-2134(01)00286-1

25. Giannakas C, Manta A, Livanou ME, Paraskeva A, Georgiadou MK, Griva N, et al. Creation and evaluation of a participatory child abuse and neglect workshop for medical students. BMC Med Educ. 2022;22(1):797. https://doi.org/10.1186/S12909-022-03837-2

26. WHO-WFME Task Force on Accreditation, World Health Organization & World Federation for Medical Education. Accreditation of medical education institutions: report of a technical meeting, Schaeffergården, Copenhagen, Denmark. Geneva, Switzerland: World Health Organization; 2004 https://apps.who.int/iris/handle/10665/43128?locale-attribute=fr&. Accessed 27 Feb 2023.

27. World Health Organization. Transforming and scaling up health professionals' education and training: World Health Organization guidelines 2013. Geneva, Switzerland: World Health Organization; 2013.

28. World Federation for Medical Education. Basic medical education WFME global standards for quality improvement. 2020. https://wfme.org/wp-content/uploads/2022/03/WFME-BME-Standards-2020.pdf. Accessed 03 Aug 2023.

29. Christian CW. Professional education in child abuse and neglect. Pediatrics. 2008;122(Suppl 1):S13–7. https://doi.org/10.1542/PEDS.2008-0715F