Review Article

Literature Review on Struggle of Guardians in Administration of Medicine in Children

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Abstract: The project is looking for studies that analyze health literacy and drug administration problems that parents and children must cope with using a validated literacy test. We used these particular search terms: The first three categories are pediatric, pharmaceutical error, which includes dose, administration, safety, and drug optimization errors, and health literacy. Three analytical topics were generated by the synthesis. The review concentrated on how various measuring approaches, advised dosages, and administration guidelines impact the frequency and severity of dosage errors. When developing an intervention to decrease drug administration errors at home, the socio-demographic characteristics of the parent, particularly their health literacy and language, are essential aspects to take into account. The review included a few possible tactics to lessen medication administration mistakes made by kids at home. Giving parents or children the recommended dosage in addition to oral instructions is one of these suggestions. Other suggestions include giving specific dose intervals, matching the recommended dose with the available measuring device, and giving dosing instructions in a visually appealing manner. The results indicate that more research is needed to fully understand the nature of these problems at home in order to optimize the use of medication by parents. It is important to consider a number of factors when developing any potential future intervention to lower medication errors among children and teenagers at home, including the sociodemographic traits of parents and teenagers, counseling, medication administration instructions, and measurement tools.

Keywords: medication, administration, pediatrics, patient education, caregiver

1. INTRODUCTION

It has been shown that children commonly administer drugs incorrectly [1]. According to past study, more than 40% of parents and caregivers in an outpatient context make dosing errors [2-4]. Inadequate pharmaceutical administration may result in adverse pharmacological events and poor patient clinical outcomes [5]. Home drug administration problems can have a wide range of complex reasons, some of which may depend on external factors [2]. In order to improve medication administration by parents and patients, a preliminary assessment of the current problems and prospective contributing variables must be made. The types and risk factors associated with medication administration errors in young persons as
well as caregivers have not been studied, despite earlier research identifying potential risk factors for clinician-led medication administration errors in children [6, 7]. Low health literacy affects between 29% and 62% of the population, according to the European Health Literacy Survey, which was conducted in eight different countries [8, 9]. Due to this, there is a notable prevalence of low health literacy and a potential connection between it and issues with the administration of children's medications. The evaluation looked for studies that looked at health literacy challenges connected to drug administration faced by parents and kids using a validated measure of literacy. This comprehensive investigation has highlighted the common problems with medication administration that occur at home, as well as potential reasons and risk factors other than health literacy that may aggravate drug administration errors.

2. MATERIALS AND METHODS

This review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) reporting requirements and the Cochrane Handbook for Systematic Reviews [10–11]. This review was not planned, carried out, reported, or distributed with the participation of any patients or members of the general public. If a study addressed medication administration mistakes in kids and teens in the WHO population age range, which is outlined as 0 to 18 years old, then it might be considered. This comprises studies describing problems with medicine that occur when a parent or child is in charge of administering or taking it outside of a therapeutic environment. To assess participants' levels of health literacy, research must employ a recognized health literacy assessment method. The search strategy was initially developed by the study team and validated by an information specialist using the Population, Intervention, Comparison, and Outcomes model. The reviewer (DTD) conducted a thorough search for studies from the database's launch until September 2020 using PubMed, Scopus, Web of Science, Cochrane Library, OpenGrey, NHS Digital Department of Health Office for National Statistics, BBC News, Bielefeld Academic Search Engine, E-thesis Online Service, and Conference proceedings via Web of Science. DTD tracked down the references for each article that was included in order to locate any more publications that might be added to the review. Two reviewers independently evaluated each article based on the aforementioned inclusion criteria in order to reduce bias. Every known study's title and/or abstract, as well as any complete articles that were possibly pertinent, were independently reviewed. Two reviewers separately extracted data using a prepared, uniform spreadsheet. If required, a third reviewer (CH) conducted a consensus discussion to address differences in the extracted data. Analytical themes were utilized to consolidate and condense the data. The research team employed theme analysis because of its versatility and propensity to discover patterns of relevant information within the data [12–14].

3. RESULTS

1230 documents in all were found using database searches and other approaches. Following the screening of abstracts and titles, 38 publications were collected in full text and their eligibility verified. 14 of them passed the conditions for inclusion and were studied in the study [15–28]. Most of the featured studies were released during the previous 12 months. Every study (n = 14) was conducted anywhere in the world. In total, 11 studies involved parents or other caregivers of children between the ages of 30 days and less than 9 years; two studies enrolled parents without regard to the child's age constraints; and one study exclusively enrolled women who were capable of bearing children. The ethnic makeup of the recruited sample was provided by the bulk of the research (n = 13), and it was largely made up of Black or
Hispanic parents or caregivers. Only women with a white ethnic ancestry were recruited for one research [22]. The final synthesis contained all recognized studies, with a concentration on the better quality investigations. Among the most frequent drug mistakes made by parents, according to eight of the included studies, are pediatric dose errors [15, 18–21, 23, 24, 26]. Parents who made underdosing errors were revealed to make more dosage and frequency errors than those who made overdosing errors, according to a study by Morrison et al.20. Based on the included research, it was observed that the measuring method parents employed and the dose volume (amount) had an impact on the amount and frequency of dosing errors by parents. Parents indicated in one study that their main dosing tool was an unstandardized kitchen spoon [17]. According to two studies, measuring cups are more prone than syringes to contain errors, especially when dealing with small dose volumes (amounts) [21, 24]. The majority of parents in a cross-sectional survey done in the USA (66% of them) considered that oral syringes were the greatest instrument for correct dosing, followed by cups (23.5%) and dosing spoons, measuring spoons, kitchen teaspoons, and droppers (10.1%) [27]. According to a different study, parents using cups with printed and etched marks made higher dosing errors (>40% departure of the indicated dose). This was considered to be caused by misunderstandings between teaspoon vs tablespoon instructions and the notion that the full cup constitutes the dose [16]. When the units on the medicinal bottle label differed from the units on the dosing instrument, parents made major dosage problems [24]. When measuring the recommended and intended amount, parents who used teaspoon/tablespoon units were more likely to use a non-standardized dosage equipment and make mistakes [19]. The kind of instructions issued was the last conceivable consideration. When it came to liquid medication, parents who received text-plus-pictogram instructions made fewer mistakes (43.9%) than those who received text-only instructions (59.0%). Additionally, this group was less likely to overdose [26]. Compared to parents who received pictogram teaching (5.4%), parents who received standard pharmaceutical counseling were 47.8% more likely to make dose errors [25]. The studies' caregivers' health literacy was examined, and six of them went on to analyze the impact of this literacy on medication errors by looking at other cofactors and dose accuracy. When compared to caregivers with suitable health literacy, Yin et al. [17] observed that caregivers with inadequate or marginal health literacy were more likely to apply a non-standardized dosing instrument and were also less informed about weight-based dosing for over-the-counter medication. A considerable association was identified in another investigation by Yin et al. [16] between health literacy and dosage errors made using cups and dosing spoons. Parents with inadequate literacy said that dosage cups were their preferred tool most of the time. Williams et al.’s adjusted analysis [27] found a strong association between health literacy levels and measurement tool preference in certain cups. The parents who made the most dose mistakes were those with low health literacy and limited English proficiency (LEP), according to Harris et al. [21]. Similar findings were made by Samuels-Kalow et al. [18], but their sample size was less than that of the group with adequate health literacy. Parents with inadequate and weak health literacy were also shown to have made medication errors. Compared to 54.1% of carers with adequate health literacy, 88.6% of caregivers with poor or marginal health literacy were not aware of weight-based dose for English-speaking caregivers [17]. In contrast to the control group, which received standard medication counseling, parents from low sociodemographic status who were prescribed a daily dose and who received simple language, pictogram instruction sheets, were less likely to make mistakes in their knowledge of dose frequency and dose accuracy (0% vs. 15.1%), according to Yin et al. [25]. Incorrect medication preparation, defined as shaking the medicine before administration for both daily doses (10.9% vs. 28.3%, p=0.04) and as-needed medication (21.5% vs. 43.0%), was less common among patients in the interventional group. [25]. Compared to the parents in
the standard group, the interventional group's participants were less likely to apply a non-standardized measuring method (daily dose: 93.5% vs 71.7%; as needed: 93.7% vs 74.7%) [25]. In a cross-sectional study, Torres et al. [28] evaluated parents' preferences and perceptions of measurement units by evaluating data from a randomized control study. When devising an intervention to prevent drug administration errors, four studies advocated taking parental sociodemographic risk variables into account [16–17, 21–26]. Parents' language and health literacy were two of these variables. According to Kalow et al., there has to be a more systematic strategy applied to discover the patient's preferred language for communication in addition to continued attempts to streamline interpretation services [18]. Combining verbal counseling with provisional dose counseling, which entails teaching to the patient how to prepare the dose, may lower the chance of dosing errors, according to three studies [15–23]. A promising strategy that may help to minimize pediatric dosage errors was proposed by Yin et al. It entailed matching the dosing instrument to the prescribed dose volume, moving to milliliter-only units, and reducing the number marks on the measurement tools [24, 26, 28]. According to a research by Wallace et al. [22], some parents would prefer recommendations that provide unambiguous dosage intervals, with the precise time and dose specified on the label.

4. DISCUSSION

The study's findings show that parents seem to make a range of medication blunders, especially when it comes to liquid medications, as supported by earlier research from the USA and this review's studies [23–25]. In keeping with another study on Spanish-speaking Latino parents, the majority of the included studies found that dosing errors were among the most frequent medication errors committed by parents [25–29]. This research found that, according to studies published in the USA, parents continue to utilize non-standard liquid dosage tools as their principal measuring tool; Yaffe et al. and McMahon et al. have previously associated this practice to drug administration issues. [31–30] The review discovered that, in the case of milliliter-only labels and tools in particular, matching the medication labels to the closest measurement tool size may be linked to lower rates of parent dosing and administering errors as well as lower chances of parents using nonstandard measurement tools, as suggested by other studies [32–45]. Four research made it evident that any future intervention aiming at minimizing parental dose and administration errors needed to take sociodemographic factors like health literacy and language into account. The review's findings brought to light a variety of efforts that patients and parents may employ to help minimize drug administration errors that occurs at home. This includes employing pictographic instructions, which were consistent in four of the included investigations [15 23 25 26], along with clear English and directions on how to use the given dosing tool. This study indicated prospective areas that, if adopted into actual practice, could aid in minimizing medication administration errors committed by patients, parents, and carers. Personalized coaching and training that can adjust to various languages and health literacy levels, as well as matching the dose tool to the required volume and employing milliliter units, are examples of viable techniques. We have noticed various limitations in our review. Our research was considerably hampered by two considerations. First, as we only investigated English-language studies, there may be publication bias and non-English studies that are germane to this subject may have gone missed. Secondly, we restricted our inclusion to research that employed a validated instrument to assess literacy. As a result, only American studies were evaluated. The issue of literacy affects all nations, but it is particularly critical in low- and middle-income nations. These papers should be included in future evaluations by expanding the search parameters. Additionally, while the study intended to include issues related to drug administration for younger individuals, specifically those between the ages of 16 and 18,
none were included since they did not meet the qualifying requirements for this evaluation. Future studies using participants who are younger—between the ages of 16 and 18—are required. Furthermore, because most of the investigations were carried out in the USA and were from the same research group, Yin et al., the generalizability of the study outcomes may be poor. Several drawbacks have been brought to light by this study group’s studies, including the use of hypothetical scenarios that may not accurately reflect how parents measure the dosage at home [16, 23, 24, 26]. The research team found it challenging to preserve blindness in some of the randomized trial studies included in this evaluation because some participants disclosed their assigned group, and no conclusions could be derived about the causes of the cross-sectional investigations [17, 19, 25]. Furthermore, one study’s release date was 13 years ago [17], meaning that it did not account for changes in procedures that have taken place locally, nationally, and worldwide. Nevertheless, based on new data in 2018 [28], this study emphasizes that non-standard dosing continues to happen today because of parental desire.

5. CONCLUSION

The findings suggest that more work needs to be done to address the nature of these issues at home in order to maximize parents’ medication use. The sociodemographics of parents and children, measuring techniques, counseling, and medication administration instructions should all be taken into account when developing any prospective future intervention targeted at lowering medication errors among children and teenagers at home.

REFERENCES


