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# Engagement of Lay Female Caregiver in Promoting Safety for Hospitalized Children at Public Hospitals, Thailand: A Cross-Sectional Study

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***Abstract***— *Hospitalized children are exposed to the risk of harm and adverse event during the hospital stays. They are defined as a vulnerable group of patients who need a representative for their role in health care services. Family caregiver engagement in promoting safety during a child's hospitalization is still unknown. This is the first empirical study in understanding their role to engage in promoting safety for hospitalized children under the Thai cultural context. The objective of this study aims to explore the engagement of lay female family caregivers to promote safety during the child's hospital staying and to examine which factors relate to their engagement. A cross-sectional study was conducted with pediatric wards of a public hospital where are verified of healthcare quality accreditation (HA), Thailand. Lay caregivers were purposively sampled in August - October 2019 (n = 160), who was staying with children aged 3-7 years of hospitalized children and focused on females aged 35-60 years and their child has evaluated the length of stay at least 3 days with respiratory diseases. Developed questionnaire of family caregiver engagement in promoting safety for the child was employed to interview by face to face. Multivariate logistic regression was used to determine the final significant factors. The scores of family caregiver engagement in promoting safety for hospitalized children were assessed at a moderate level (mean = 3.62, SD=0.30). The safety-related behaviors were found at a low level in both challenges' behaviors and factual behaviors. For example, reminding doctors or nurses to clean their hands, wearing a clean mask to prevent infection, observe the label on the container, and make sure doctors and nurses check the child's wrist band before giving any medicine, test, or treatment. Educational level was found to be significantly associated with family caregiver engagement in multivariate analysis (p <0.05).*

***Conclusion:*** *This study suggested that there are opportunities for improvement in safety-related behavior. Therefore, health care providers should provide programs or tactics to raise their active engagement to promote safety for hospitalized children.*

***Keywords***— *Children, engagement, hospital, lay caregiver, patient safety.*

## I. INTRODUCTION

Patient safety in pediatric was defined as keeping the child from happening of harm and injury which caused directly by the health care system [1]. Safety is challenges and complex in the pediatric context. Hospitalized children are exposed to the risk of harm and adverse event during hospital staying. They are highly vulnerable to medical error compared to adult which vary in several situations. Moreover, it may potentially harmful errors more frequently [1, 2]. Medical errors in child's care can involve in medications, diagnosis, equipment, lab reports and environment. Therefore, safety during hospitalization of child completely depend on parents and family caregivers. They are defined as vulnerable group of patient who need a representative for their role in health care services. There was stated that family engagement in childcare can enhance safety for their child [3].

The literature reviews showed most of the studies have interested in parents' role to involve or participate in child care [4-18]. These have focused on to survey on parent role to participate in daily routine, basic caring, and their needs in childcare process. In a decade, there are increasing studies of hospitalized child safety issues [2, 3, 20-23]. The concept of engagement is raised to link to the role of patient and family member. Engagement in safety is a particular case of health-promoting behaviors [24]. This was defined as the action individuals play a role actively involve for own health in order to get advantages [25]. Engaging patients and families in being an advocate for safety can contribute to decreasing needless healthcare disbursement and improve patient safety [26].

Since hospitalized children unable communicate with doctor and nurse by themselves. They need a family caregiver to represent them in each process of care. Family caregivers have legal right and role to take care and involve in childcare treatment. These are like arms to make a good and protect harm for their child. We indicated engagement in these cases links to the engagement of family caregivers. The definition is family caregiver play an actively involved in promoting safety with healthcare staff by safety-related behaviors to prevent harm during the child's care process. The safety-related behaviors consist of the family caregiver providing hospitalized children medical history, watching and checking care processes, identifying and reporting treatment complications, and speaking up if they have any safety-related concerns that their child received [27]. These were used to study of adult patients willing to participate in their care [28, 29]. We reviewed 20 Tip to Help Prevent Medical Errors in Child's Care [30] and Speak up- Prevent Errors in your child's care [31]. "ARM" was developed and raised to infer safety-related behaviors to prevent hospitalized children from harm or adverse event. This abbreviation is represented for key safety-related behaviors of family caregiver action to promote

safety of hospitalized children. A-represent for Advocate to Ask, R-represent for Report and Response and M-represent for Monitoring and Make sure.

Under medical paternalism pattern, patient and family caregiver see themselves to be disable partner to involving or engaging towards some action which influence on health outcomes and their safety [32]. Previous studies revealed that parent role to engage in childcare naturally vary. There were factors considered to be either barriers or facilitators of engagement such as health care organization level, role of healthcare professional, characteristics of patients and family caregivers [27]. Also, Thailand there are mostly of lay people in the public hospitals who have faith and respect to healthcare professional. Limited of health care staff and vary of hospitalized patients in public hospitals lead family caregivers have to watch over and take care for their child by themselves mostly. There are paucity data about role of family caregiver to promote safety during child's hospitalization. Moreover, a little known about factors that related to engagement of family caregiver in promoting safety. Thus, this is the first study to explore empirical information to create such efforts to advice family caregiver to be a vigilance for child's safety. We need to understand their role to engage in promoting safety for hospitalized children. This study aimed to explore engagement of family caregiver to promote safety during child's hospital staying and to examine which factors relate to their engagement.

## II. METHODOLOGY

*Design and population:* A cross-sectional study was conducted with paediatric wards of public hospital where are verified of healthcare quality accreditation (HA), Thailand. We purposively sampled lay caregivers in August - October 2019 (n = 160), who were female aged 35-60 years and staying with hospitalized children aged 3-7 years of children. We focused on a child was evaluated the length of stay at least 3 day with respiratory diseases. This study was approved by The Research Ethics Review Committee for Research Involving Human Research Participants, Health Sciences Group, Chulalongkorn University, Thailand (COA No.165/2019).

*Questionnaire:* Lay female caregivers provided key information divided into two parts. Part I, demographic characteristics including female caregivers' age, marital status, education level, relationship with child, experienced in hospitalization, experienced in an unsafe event, age of child, severity of illness, child's length of stay (days) and number of previous admissions. Part II, questionnaire about engagement in promoting safety for hospitalized children. Thirty-nine items were developed based on literature reviews of safety-related behaviours [28] and [29]. Also, and 20 Tips to Help Prevent Medical Error in Children [30] Speak Up: Prevent Errors in Your Child's Care [31] guidelines were used to developed questions related to child's safety. The range of score was separated to 3 level calculated by class interval and range [33], scores 1.00 – 2.33 was presented to family caregiver's engagement in promoting safety of hospitalized children is a low level, scores 2.34 – 3.66 was presented to family caregiver's engagement in promoting safety of hospitalized children is a moderate level and score 3.67- 5.00 was presented to family caregiver's engagement in promoting safety of hospitalized children is a high level. This measurement tool was validated content validity by 3 experts in area of quality and patient safety improvement. We ensured face validity by carried out among female caregivers of hospitalized children in another public hospital. The Cronbach's alpha coefficient reported the internal consistency of questions was 0.81.

*Data analysis:* Data are presented as ranges, frequency, percentages, mean, and standard deviations. Binary logistic regression was tested for the association between engagement in promoting safety of hospitalized children and factors variables involved characteristics of female caregivers and hospitalized children. A chi-square analysis of each variable was first done, and then variable with $p<0.25$ were included in the multivariate analysis. Statistical analysis was performed using the Statistical Package for the Social Sciences Program (SPSS), version 22.

## III. RESULTS

Most of the female caregivers were married mother and mean of age 43.5 years. Their educational level was equal majority under a bachelor's degree. Although 75% had hospitalization experience, only 19.4% had experience in unsafe events. More than half of hospitalized children were 3-5 years old. Their severity of illness perceived by family caregivers was a moderate level. 70% of children had a previous admission. The length of stay (LOS) was calculated based on admission and discharging dates and average 3.66 days (Table 1).

### *Engagement in promoting safety for hospitalized children*

Lay female caregiver assessed their engagement in promoting safety for hospitalized children at a moderate level (mean = 3.62, SD=0.30). Also, dimensions of advocate to ask (mean = 3.60, SD=0.42) and monitoring-make sure (mean = 3.46, SD=0.52) were evaluated at a moderate level. Whereas the dimension of report and response was assessed at a high level (mean = 3.82, SD=0.26). Participants assessed items of engagement in promoting safety-related behaviors were found at a low level (mean range 1.00- 2.33). In the intervening time, asking about the doctor and nurse about child's condition and treatments was the highest score (mean=4.45, SD=0.52). Dimension of report and response indicated that there were low score in items of reminding doctors or nurses to clean their hands (mean=1.25, SD=0.56) and respond to prevent infection by wearing clean mask (mean=1.55, SD=0.68). There was the highest score of reporting child's medication history and reporting about child's drug allergies (Mean=4.82, SD=0.38, Mean=4.80, SD=0.39) respectively. For dimension of monitoring and make sure found that participant had a low engagement scores in items of observe the corrective label on the container, make sure doctors and nurses check the child's wrist band before giving any medicine, test, or treatment, and checking child's hospital identification bracelet. While there

was a highest score in items of monitoring child's symptoms to report on clinical rounds (Mean=4.41, SD=0.53) (Table 2).

TABLE I. Characteristics of female caregivers and hospitalized children (n=160)

| Factor variables | Frequency (n) | Percentage (%) |
|---|---|---|
| **Age of female caregiver (years)** | | |
| 35-45 | 106 | 66.3 |
| 46-55 | 27 | 16.9 |
| > 55 | 27 | 16.9 |
| Mean=43.51, SD=8.31, Min=35, Max=60 | | |
| **Marital status** | | |
| Single | 18 | 11.3 |
| Married | 134 | 83.8 |
| Separated/divorce/widowed | 8 | 5.0 |
| **Education level** | | |
| Primary and elementary school | 65 | 40.6 |
| Secondary and high school | 66 | 41.3 |
| Bachelor | 29 | 18.1 |
| **Relationship with child** | | |
| Mother | 90 | 56.3 |
| Grandmother | 60 | 37.5 |
| Aunt | 10 | 6.3 |
| **Experienced in hospitalization** | | |
| No | 40 | 25.0 |
| Yes | 120 | 75.0 |
| **Experienced in an unsafe event** | | |
| No | 129 | 80.6 |
| Yes | 31 | 19.4 |
| **Age of child (years)** | | |
| 3-5 | 99 | 61.9 |
| 6-7 | 61 | 38.1 |
| Mean=4.92, SD=1.53, Min=3, Max=7 | | |
| **Severity of illness** | | |
| Low | 7 | 4.4 |
| Middle | 113 | 70.6 |
| High | 40 | 25.0 |
| **Child's length of stay (days)** | | |
| 3 days | 88 | 55.0 |
| 4 days | 47 | 29.4 |
| ≥5 days | 25 | 15.6 |
| Mean=3.66, SD=0.92, Min=3, Max=8 | | |
| **Number of previous admissions** | | |
| No admission | 48 | 30.0 |
| 1 time | 31 | 19.4 |
| 2 times | 42 | 26.3 |
| ≥ 3 times | 39 | 24.4 |
| Mean=1.64, SD=1.59, Min=0, Max=10 | | |

*Association between socio-demographic factors and family caregiver's engagement in promoting safety for hospitalized children*

A chi-square analysis showed that the educational level of lay female caregiver ($p$=0.019) and their relationship to the child (p=0.045) were significantly associated with the engagement in promoting safety for children (Table 3).

*Multivariate analysis of each factors with family caregiver engagement in promoting safety for hospitalized children*

The multivariate analysis was performed in the final. Although, the multivariate regression analysis model was not statistically significant, $\chi 2$ = 12.34, p-value = 0.09. The model explained 10.0% of the variance in score of engagement in promoting safety for children and correctly classified 63.1% of cases. The result showed that the education level of female caregivers was associated with engagement in promoting safety for children. In case their educational have leveled up from the primary-elementary school to be the secondary-high school, there was significantly associated with more engagement in promoting safety (OR=2.581, 95%CI 1.901-6.538) (Table 4).

TABLE II. Engagement in promoting safety for hospitalized children (low – moderate score) (n=160)

| | Questions of engagement in promoting safety for hospitalized children | Mean | SD |
|---|---|---|---|
| 1 | Reminding doctor or nurse to wash their hands | 1.25 | 0.56 |
| 2 | Respond to prevent infection by wearing clean mask when close up the child | 1.55 | 0.68 |
| 3 | Observe to see the corrective label on the container of child's sample | 2.41 | 1.20 |
| 4 | To make sure doctor and nurse check the wrist band and ask your child's name before giving any medicine, test or treatment | 2.68 | 1.27 |
| 5 | Asking about eating or drinking before the child's test | 2.79 | 0.97 |
| 6 | Asking which test will be done and what the child should be prepared for the test | 2.79 | 0.99 |
| 7 | Asking what has been done to make sure your child is safe during the test | 2.82 | 1.10 |
| 8 | Asking about medical equipment removal | 2.84 | 1.13 |
| 9 | Checking child's hospital identification bracelet | 2.93 | 1.38 |
| 10 | Asking a family member or friend to stay with at hospital | 3.03 | 1.33 |
| 11 | Asking what side effects of medicine are likely and how to solve | 3.11 | 1.08 |
| 12 | Asking about the test results in case did not hear report by health care staff | 3.11 | 0.93 |
| 13 | Asking the names of the medicine | 3.24 | 1.07 |
| 14 | Asking about the length of stay that the child will be in hospital | 3.51 | 0.95 |
| 15 | To make sure that knowing who is the child's pediatrician | 3.54 | 0.91 |

## IV. DISCUSSION

To our knowledge, this is the first questionnaire survey of family caregiver engagement in promoting safety in a specific area of pediatric patients in public hospitals, Thailand. We aimed to identify factors associated with this engagement. Our survey findings indicated the empirical evidence about what safety-related behaviors of lay female caregivers actively involved in promoting safety for hospitalized children.

The present study discovered that our developed survey solicited an important result of lay female engagement in promoting safety. The Lay female caregiver had assessed their engagement in promoting safety for a child at a moderate level. There were safety-related behaviors for quality and safety improvement in the family's role. Descriptive items were demonstrated that 15 of 39 items were low and moderate level. The items were both of challenging behavior and actual possible behaviors in which the female caregiver should know in basic. The challenging behaviors, such as reminding or ensure healthcare professional staff about hands washing and wearing hygiene masks is difficult to play a role to promote safety for the child. This item was only in parent's perspectives that they interpreted as one of hospital safety meaning [20]. Moreover, it was related to interaction between

patient- health care professionals. The cultural factor is a major barrier for laypeople to involvement [27]. They are reluctant to play this role because they fear and worry about negative interactions in which the doctor or nurse will treat their child later. They thought that they could interrupt during the care process [34, 35]. However, our finding contrasted with the previous survey reported that most parents report being comfortable asking a doctor or nurses to wash their hands [3].

TABLE III. Association between socio-demographic factors and family caregiver's engagement in promoting safety for hospitalized children (n=160)

| Factor variables | Level of engagement n (%) | | $\chi^2$ | *p*-value* |
|---|---|---|---|---|
| | moderate | high | | |
| **Age of female caregiver** | | | | |
| 35-45 years | 59 (55.7) | 47(44.3) | 4.212 | 0.122 |
| 46-55 years | 20(74.1) | 7(25.9) | | |
| > 55 years | 19(70.4) | 8(29.6) | | |
| **Marital status** | | | | |
| Single | 8(44.4) | 10(55.6) | 2.451 | 0.326 |
| Married | 85(63.4) | 49(36.6) | | |
| Separated/divorce/widowed | 5(62.5) | 3(37.5) | | |
| **Education level** | | | | |
| Primary and elementary school | 48(73.8) | 17(26.2) | 7.949 | 0.019* |
| Secondary and high school | 33(50.0) | 33(50.0) | | |
| Bachelor | 17(58.6) | 12(41.4) | | |
| **Relationship with child** | | | | |
| Mother | 49(54.4) | 41(45.6) | 4.014 | 0.045* |
| Grandmother and aunt | 49(70.0) | 21(30.0) | | |
| **Experienced in hospitalization** | | | | |
| No | 22(55.0) | 18(45.0) | 0.878 | 0.349 |
| Yes | 76(63.3) | 44(36.7) | | |
| **Experienced in an unsafe event** | | | | |
| No | 79(61.2) | 50(38.8) | 0.000 | 0.996 |
| Yes | 19(61.3) | 12(38.7) | | |
| **Age of child** | | | | |
| 3-5 years | 64(64.6) | 35(35.4) | 1.262 | 0.261 |
| 6-7 years | 34(55.7) | 27(44.3) | | |
| **Severity of illness** | | | | |
| Low | 4(57.1) | 3(42.9) | 4.249 | 0.119 |
| Middle | 64(56.6) | 49(43.4) | | |
| High | 30(75.0) | 10(25.0) | | |
| **Child's length of stay** | | | | |
| 3 days | 50(56.8) | 38(43.2) | 2.077 | 0.354 |
| 4 days | 30(63.8) | 17(36.2) | | |
| ≥5 days | 18(72.0) | 7(28.0) | | |
| **Number of previous admission (times)** | | | | |
| No admission | 27(56.3) | 21(43.8) | 2.252 | 0.522 |
| 1 time | 17(54.8) | 14(45.2) | | |
| 2 times | 27(64.3) | 15(35.7) | | |
| ≥ 3 times | 27(69.2) | 12(30.8) | | |

* Statistically significant *p*-value < 0.05 calculated by the Chi-square test or Fisher's exact test

In addition, some items were not interaction behavior with health care professionals which meant that lay female caregivers should know basically. For instance, they should have to know about preventing infection by wearing a clean mask, observing the corrective label on the container of the child's sample, and to make sure health care professionals to check the wrist band and child's name before giving any medicine, test or treatment.

TABLE IV. Multivariate analysis of each factors with family caregiver engagement in promoting safety for hospitalized children (n = 160)

| Factor variables | B | p-value | OR | 95% CI |
|---|---|---|---|---|
| **Age of female caregiver** | | | | |
| 35-45 years | Reference | | | |
| 46-55 years | -.336 | 0.641 | 0.714 | 0.174 -2.941 |
| more than 55 years | 0.234 | 0.755 | 1.264 | 0.291-5.488 |
| **Educational level** | | | | |
| Primary elementary school | Reference | | | |
| Secondary - high school | 0.948 | 0.046* | 2.581 | 1.901- 6.538 |
| Bachelor | 0.552 | 0.330 | 1.736 | 0.573 -5.264 |
| **Relationship to the child** | | | | |
| Mother | Reference | | | |
| Grandmother and aunt | -0.142 | 0.809 | 0.868 | 0.275 -2.741 |
| **Severity of illness** | | | | |
| Low | Reference | | | |
| Moderate | -0.100 | 0.905 | 0.905 | 0.178 -4.606 |
| High | -0.812 | 0.361 | 0.444 | 0.078 -2.538 |

Notes: Family caregiver engagement in promoting safety for hospitalized children (moderate = 2.34-3.66, high = 3.67- 5.00). B, regression coefficient; S.E., standard error; OR, odds ratio; CI, confidence interval. *Significant at p < 0.05.

These findings could be assumed that knowledge and experience in hospitalization were important in a parental role to involve in the safety of children. This like to previous study stated that patient and family knowledge of clinical role and health care process was a key factor in engagement [3, 35]. The low level of involvement depends on the fact that family caregivers had no experience of the previous hospitalization [36] and also no confidence in participation in the technical care of their child [16, 37, 38]. Therefore, their knowledge and experience caused they might hesitate to play some possible safety-related behaviors.

In each dimension of engagement in promoting safety for hospitalized children, the findings revealed that lay female caregiver engages in promoting safety at a high level. We found female caregivers preferred to ask about the child's condition and treatments. This similar to results of the qualitative analysis found that questioning and understanding their child illness was the most habitual of parental response to involve in child's clinical round [8, 10]. In the dimension of report and response, they engaged in reporting a child's medication history and drug allergies. Lay female caregiver have learned by their prior experiences and perceived that was a basic reporting behavior when they interact with doctor and nurse. This item is interaction behavior, it was encouraged by health care professionals. This point consistent with the previous study indicated that the role of health care staff was an influencing factor on parental involvement in childcare [15, 20]. Besides, monitoring a child's symptoms was an important role in staying with a child. This factual safety-related behavior was easy to act. Also, it was an emotional concern when their child stayed at the hospital. The result can explain that lay female caregivers knew what basic behavior should be done and aware that they are the first persons to detect their child conditions. This finding be in line with the previous study found that parent needed to stay at the bedside to

provide individual care and to ensure appropriated child monitoring [6].

The finding of the bivariate analysis indicated that the educational level of lay female caregivers and relationship to the child was associated with lay female caregivers' engagement in promoting safety. This finding was consistent with prior studies found that education of parent significantly influences the needs of attending a child's care to ensure harm prevention and participation in safety practices [20, 39]. On the other hand, some previous studies found that family caregiver's educational factor did not influence on demanding to involve in extra care or in decision making, and need to watch over care [3, 10, 40]. Surprisingly, for a relationship to child factor in our finding was showed association with the engagement of female caregiver. It was in contradict with previous studies found that relationship to the child was not correlated with parent participation in a child's care [36, 39, 40]. By the result of the present study, mothers compared to another group had a different proportion of their engagement on a high level and could explain that who were mothers tend to engage in promoting safety for the child. In addition, this relationship as grandmothers and aunts might indicate a variety of emotional concern for their child's illness and their ability to act for promoting safety. Moreover, our study classified the relationship to a child specifies only females. There was a difference from previous studies that had classified by including the father.

The educational level factor remained associated with lay female caregivers' engagement in the multivariate analysis. In case their educational have leveled up, it likely to be more engaged in promoting safety. The finding could elucidate that the educational level implied to knowledge and power of people. By facts of our findings, the majority education of respondents was under a bachelor's degree. Although there was no association between female caregiver experience in hospitalization and unsafe event in this study, some lay female caregivers are mothers at a younger age and they deliver not only one child. Thus, it could count their experience and historical knowledge as the attribution to their education and associated with engagement behaviors. These were stated in the previous study of patient and family engagement perspective in harm reduction stated that historical knowledge [35] and study about parent's concern for errors of child's hospitalization found that family caregivers' prior experience with health care services influence on behavior during hospitalization [41].

## V. LIMITATIONS AND RECOMMENDATIONS

This is the first of our study using a developed questionnaire of female caregiver engagement in promoting safety for a child. Thus, there is no related study to compare our results comprehensively. The finding could state that this is our strength in the study. However, there were several limitations. Firstly, we conducted data in public hospitals with laypeople.

Our evidenced results of lay female caregiver engagement in promoting safety for hospitalized children were limited and cannot be generalized to other female caregivers in private hospitals. We recommended that surveying should interest in a larger caregiver both public hospitals and private hospitals. A descriptive survey with questionnaires and observation would be the next steps. Secondly, this study recruited lay female caregivers and hospitalized children with limited criteria, such as a range of age and length of stay. These might result in finding factors that were found that only educational level had an association. Thus, inclusion criteria and sample-sized should be reviewed. The recommendation for further study followed by the fact of descriptive items, the study could provide education programs or some learning media to educate laypeople to understand their role in order able to be a safety promoter in child care.

## VI. CONCLUSION

Patient safety in pediatric is challenging for laypeople who are parents or family caregivers. There are various factors influence on how to practice for safety-related behaviors, especially educational factor which relates to knowledge. The present study explores 160 female caregiver engagement in promoting safety for hospitalized children at a moderate level. This is empirical data of caregiver roles related to safety issues in child hospitalization in public hospitals. Further study should consider larger sample size and inclusion criteria should be reviewed. Our findings suggest that health care providers should educate the child's patient safety knowledge to family caregivers. Providing tools or tactics for the caregiver to be an active role in the safety of hospitalized children should be taken to account.

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## CONFLICT OF INTERESTED

The authors have declared they have no potential conflicts of interest.

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