



**DETERMINANTS OF MULTIDISCIPLINARY TEAM KNOWLEDGE ABOUT
CASE MANAGERS: A QUANTITATIVE STUDY**

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ABSTRACT

The implementation of the case manager (CM) has not been optimal according to what was expected. Even though there is a positive perception about the role of CM held by nurses and NA as part of the Professional Care Providers (PPA) is very necessary. The knowledge factor is the factor that has the most influence on positive perceptions about the role of CM. There are many things that can influence nurses' and NAs' knowledge about CM. This study aims to determine the factors related to nurses' and NAs' knowledge about CM. This quantitative correlational research used a cross-sectional approach involving 384 nurses and 129 NAs. The sampling technique used is multistage random sampling and simple random sampling. Each respondent has filled out a structured questionnaire via Google Form and has been analyzed using descriptive statistics, chi-square test, and binary logistic regression. This study used a questionnaire on knowledge about CM with a Cronbach Alpha value of 0.634. This research found that the majority of nurses and NAs had insufficient knowledge about CM, 248 people (65%) and 80 people (62%). The factors age, education and length of service were associated with nurses' knowledge about CM ($p=0.001$; $p<0.001$; and $p<0.001$). The factors age and years of service were associated with NA's knowledge about CM ($p=0.017$; and $p=0.024$). This study also found that knowledge was a determining factor in nurses' knowledge about CM (OR=2.53; 95%CI 1.60-4.01; $p<0.001$). These findings support the theory that age, education and years of service are related to knowledge about CM. Socialization about case managers and increasing the role of case managers in services needs to be carried out by hospital management.

Keywords: case manager; knowledge; nurse; nurse anesthetist

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INTRODUCTION

Case managers (CMs) are healthcare professionals who work with individuals and families (Joo, J. & Huber, D., 2017). CMs play an important role in today's complex healthcare system (Fraser et al., 2018). CMs can perform case management in various healthcare settings, but not all CMs follow up with patients after they are discharged from the hospital (Fattorusso & Quinn, 2013). The implementation of case management depends on the profession that sets the CM standards and their commitment to being involved in patient care. This indicates that the implementation of CM is not yet optimal as expected.

The results of a study conducted by (Auladi et al., 2022) in the ICU of Dr. Hasan Sadikin General Hospital found that the role of CM was ineffective in optimizing integrated patient care and helping to improve interprofessional collaboration, facilitating the fulfillment of patient care needs, including those of families and caregivers. The results of a study conducted by (Julietta et al., 2022) at Tarutung Regional General Hospital found that the implementation of case management by CMs in hospitals was not optimal because the person appointed by the hospital management was different from the person who became the CM. This is supported by (Mardean et al., 2021), who found that the first priority was the suboptimal function of guidance in CM documentation at Type A hospitals in Jakarta. There was even a difference in the effectiveness of the role and function of CM in improving the

quality of care in the inpatient ward of MK General Hospital with a p-value of 0.000 (Noviani et al., 2021).

In fact, CM should carry out five components of case management, namely bridging the health system to the community, providing care processes, providing individually tailored health promotion and prevention, providing assistance in decision-making, and providing comprehensive support (Putra & Sandhi, 2021). However, different results were found by (De Luca et al., 2022), who found that CMs have represented facilitators of clinical-therapeutic pathways while acting as reference figures, supporting patients, their families, and multidisciplinary teams. This is supported by (Devi et al., 2021), who found that out of 399 nurses, the majority or 205 (51%) nurses had a positive perception of the role of CM. Other health professions were also found to have a positive perception of the role of CM. The results of a study conducted by (Devi et al., 2022) found that out of a total of 369 nurse anesthetists (NAs), the majority (60%) had a positive perception of CM.

A positive perception of the role of CM held by nurses and NAs is certainly necessary. This positive perception indicates that nurses and nurse anesthetists, as part of the Professional Care Providers (PPA) who work with CM in providing care to patients, have a common understanding of how the role of CM should be in the implementation of a collaborative practice system. Knowledge is the factor that most influences positive perceptions of the role of CM. The results of a study conducted by (Devi et al., 2021) found that the determining factor for perceptions of the role of CM among nurses was knowledge (Adj. OR=2.36, 95% CI 1.30-4.26, $p = 0.005$). The same results were also found in NA. The results of a study conducted by (Devi et al., 2022) found that knowledge was the most influential factor on nurse anesthetist perceptions of the role of CM (Adj. OR= 3.2, 95% CI 2.03-5.07, $p < 0.001$).

Knowledge greatly helps healthcare workers understand how case management is carried out. The better the knowledge about CM, the better the cooperation between healthcare workers and CM. There are many factors that influence knowledge about CM. The results of a study conducted by (Wahyunadi et al., 2021) found that there was a significant relationship between age ($p\text{-value} = 0.044$) and length of service ($p\text{-value} = 0.024$) and the knowledge of anesthesiologists about CPR during the COVID-19 pandemic. A study conducted by Tavares et al. (2015) found that factors related to knowledge were professional category and receiving training and/or guidance to complete the transfusion process ($p < 0.01$). Another study found that the level of education ($p = 0.041$) was also associated with the level of knowledge of health workers at the Manado Community Health Center (Sepang et al., 2013).

Given that no literature has been found discussing the relationship between age, education level, length of service, and counseling with knowledge about CM, it is necessary to determine the relationship between age, education level, length of service, and training with knowledge about CM. This study aims to identify factors related to nurses' and NAs' knowledge of CM. It is hoped that the findings of this study can be used to optimize interprofessional collaboration within the PPA team and achieve continuous patient care.

METHOD

This quantitative correlation study used a cross-sectional design conducted in Bali Province in September-October 2024. The population in this study consisted of all nurses and nursing assistants in all hospitals in Bali Province. There were a total of 12,455 nurses spread across Bali Province (BPS Kota Denpasar, 2024). Meanwhile, there were a total of 190 nursing assistants spread across Bali Province (DPD IPAI Provinsi Bali, 2023). The sample used in this study was based on the Slovin formula, consisting of 384 nurses and 129 NAs. The sample consisted of all nurses and NAs working in hospitals. Sampling was conducted using

multistage random sampling. First, the researchers used simple random sampling to determine the selected districts/cities. Second, the researchers used simple random sampling to determine the selected hospitals. At the selected hospitals, the researchers used snowball sampling, in which they selected several nurses and NAs who met the research criteria to be respondents. These respondents then contacted other samples, and so on, until the sample size of 384 nurses and 129 NAs was reached. The sample criteria for this study are inclusion and exclusion criteria. Inclusion criteria include nurses and NAs working in surgical inpatient rooms and operating rooms, nurses and NAs who have a Registration Certificate (STR) as a nurse or NA who are still active, and nurses and NAs who are willing to be research respondents. The exclusion criteria are nurses or nurse anesthetists who have less than 1 year of work experience. This research has been approved by the ITEKES Bali Research Ethics Committee (Number: 04.0577/KEPITEKES-BALI/XI/2023).

The research instrument used in this study was a knowledge questionnaire about CM with a Cronbach Alpha value of 0.634 (Devi et al., 2022). This questionnaire contains demographic data consisting of name (initials), gender, age, profession, education level, length of service, and participation in CM counseling/training. The knowledge questionnaire about CM was designed to assess knowledge consisting of the domains of knowing, understanding, application, analysis, synthesis, and evaluation consisting of 10 statements. Later, respondents will choose the alternative answers True, Don't Know, False. For favorable statements True is worth 1, Don't Know is worth 0 and False is worth 0. Meanwhile, for unfavorable statements True is worth 0, Don't Know is worth 0 and False is worth 1. The maximum score is 10 and the minimum score is 0. The scores obtained will be added up and the result will be divided by the maximum score and then multiplied by 100%.

The data analysis techniques used in this study are univariate analysis, bivariate analysis, and multivariate analysis. This study uses univariate analysis, namely frequency distribution with percentage or proportion measures for each research variable (age, education level, length of service, counseling/training on CM, and knowledge about CM). This study examines the relationship between independent variables, namely general characteristics (age, education level, and length of service) and dependent variables, namely knowledge about CM, using Chi-Square. Furthermore, in this study, to identify the determinants of nurses' and nurse anesthetists' knowledge about CM, the researcher analyzed the independent variables (age, education level, length of service) with the dependent variable (knowledge about CM) using binary logistic regression. This is because the dependent variable is dichotomous or binary (low knowledge and good knowledge).

RESULT

Knowledge about case managers

Table 1.

Nurses' knowledge about case managers (n=384)

Nurses' knowledge about case managers	f	%
Enough	248	65
Good	136	35

Based on table 1, it can be seen that the majority of nurses have knowledge about case managers in the insufficient category, totaling 248 people (65%).

Table 2.

NA knowledge about case managers (n=129)

Nurses' knowledge about case managers	Frequency (f)	Percentage (%)
Enough	80	62
Good	49	38

Based on table 2, it can be explained that the majority of NA have knowledge about case managers in the insufficient category, totaling 80 people (62%).

Factors related to nurses' and NAs' knowledge about case managers

Table 3.

Factors related to nurses' knowledge about case managers (n=384)

Factor	knowledge about case managers		Total f (%)	P-value
	Enough f (%)	Good f (%)		
Characteristics				
Age				0,001*
< 33 Tahun	140 (73)	53 (27)	193 (51)	
≥ 33 Tahun	108 (57)	83 (43)	191 (49)	
Education				< 0,001*
DIII/DIV	119 (76)	38 (24)	157 (41)	
S1/S2	129 (57)	98 (43)	227 (59)	
Employment Period				< 0,001*
< 10 Tahun	154 (72)	59 (28)	213 (56)	
> 10 Tahun	94 (55)	77 (45)	171 (44)	

Table 3 provides details on the relationship between age, education, and length of service with nurses' knowledge of case managers. The results of the analysis of the relationship between age and nurses' knowledge about case managers showed that 140 nurses (73%) aged < 33 years had insufficient knowledge about case managers. Meanwhile, among nurses aged ≥ 33 years, 108 nurses (57%) had insufficient knowledge about case managers. The results of the analysis of the relationship between education and knowledge about case managers showed that 119 nurses (76%) with DIII/DIV education had insufficient knowledge about case managers. Meanwhile, among nurses with S1/S2 education, there were 129 nurses (57%) who had insufficient knowledge about case managers. The results of the analysis of the relationship between length of service and knowledge about case managers showed that 154 nurses (72%) with < 10 years of service had insufficient knowledge about case managers. Meanwhile, among nurses with ≥ 10 years of service, there were 94 nurses (55%) who had insufficient knowledge about case managers. Based on the overall statistical test results, it was found that the variables of age, education, and length of service had p-values < 0.05, namely 0.001, < 0.001, and < 0.001. Therefore, it can be concluded that there is a relationship between age, education, and length of service and nurses' knowledge about case managers.

Tabel 4.

Factors related to NA knowledge about case managers (n=129)

Factor	knowledge about case managers		Total f (%)	P-value
	Enough f (%)	Good f (%)		
Characteristics				
Age				0,017*
< 33 Tahun	45 (73)	17 (27)	62 (48)	
≥ 33 Tahun	35 (52)	32 (48)	67 (52)	
Education				0,164
DIII/DIV	29 (71)	12 (29)	41 (32)	
S1/S2	51 (58)	37 (42)	88 (68)	
Employment Period				0,024*
< 10 Tahun	49 (71)	20 (29)	69 (53)	
≥ 10 Tahun	31 (52)	29 (48)	60 (47)	

Table 4 provides details of the relationship between age, education, and length of service with NA knowledge about case managers. The results of the analysis of the relationship between age and NA knowledge about case managers showed that 45 NAs (73%) aged < 33 years had insufficient knowledge about case managers. Meanwhile, among NAs aged ≥ 33 years, 35 NAs (52%) had insufficient knowledge about case managers. The results of the analysis of the relationship between education and knowledge about case managers showed that 29 NAs

(71%) with DIII/DIV education had insufficient knowledge about case managers. Meanwhile, among NAs with S1/S2 education, there were 51 NAs (58%) who had insufficient knowledge about case managers. The results of the analysis of the relationship between length of service and knowledge about case managers showed that 49 NA (71%) with < 10 years of service had insufficient knowledge about case managers. Meanwhile, among NA with ≥ 10 years of service, there were 31 NA (52%) who had insufficient knowledge about case managers.

Based on the overall statistical test results, it was found that the variables of age and length of service had p-values < 0.05, namely 0.017 and 0.024. Therefore, it can be concluded that there is a relationship between age and length of service and NA knowledge about case managers. Meanwhile, the statistical test results for the Education variable had a p-value > 0.05, namely 0.164. Therefore, it can be concluded that there is no relationship between Education and NA knowledge about case managers.

Determinants of nurses' and NAs' knowledge about case managers

Table 5.

Determinants of nurses' knowledge about case managers (n=384)

Variabel	B	S.E	OR	95%CI	p-value
Age					
< 33 Tahun*					
≥ 33 Tahun	0,30	0,37	1,36	0,66 – 2,80	0,411
Education					
DIII/DIV					
S1/S2*	0,91	0,24	2,53	1,60 – 4,01	<0,001*
Employment Period					
< 10 Tahun*					
≥ 10 Tahun	0,58	0,37	1,79	0,87 – 3,69	0,115

The results of statistical testing using binary logistic regression in Table 7 show that the variable significantly associated with nurses' knowledge of case managers is age. Nurses with a bachelor's or master's degree are 2.53 times more likely to have good knowledge about case managers than nurses with a diploma or associate's degree (OR=2.53, 95% CI 1.60-4.01, p <0.001). Meanwhile, the variables of age and length of service had p-values > 0.05, namely 0.411 and 0.115. Therefore, it can be concluded that there is no significant relationship between age and length of service and nurses' knowledge about case managers.

Table 6.

Determinants of NA knowledge about case managers (n=129)

Variabel	B	S.E	OR	95%CI	p-value
Age					
< 33 Tahun*					
≥ 33 Tahun	0,64	0,73	1,90	0,46 – 7,89	0,378
Employment Period					
< 10 Tahun*					
≥ 10 Tahun	0,28	0,72	1,32	0,32 – 5,41	0,696

The results of statistical testing using binary logistic regression in Table 8 show that the variables of age and length of service have p-values > 0.05, namely 0.378 and 0.696. It can therefore be concluded that there is no significant relationship between age and length of service and NA's knowledge of case managers.

DISCUSSION

This study found that the majority of nurses had insufficient knowledge about case managers, with 248 (65%) respondents lacking such knowledge. The same result was found among NAs, with the majority of NAs having insufficient knowledge about case managers, with 80 (62%) respondents lacking such knowledge. Knowledge about case managers includes the role of case managers in initial screening, planning, facilitation and advocacy, service coordination, evaluation, and post-discharge follow-up. The results of this study differ from those of a study

conducted by (Devi et al., 2022), which found that the majority of NAs had good knowledge about case managers, namely 343 (93%). Another study conducted by (Devi et al., 2021) also found the same results. This study revealed that the majority of nurses had good knowledge about case managers, namely 340 (85%). This difference may be influenced by demographic factors and the hospitals where nurses and NAs work. Considering that this study only involved nurses and NAs in Bali Province, this lack of knowledge about case managers means that the majority of nurses and NAs in Bali Province are unaware of all information related to case managers.

Lack of knowledge about case managers can cause nurses and NAs to tend to behave poorly when working with case managers in providing care to patients. Considering that knowledge forms the cognitive basis for attitudes and behavior. This is supported by research conducted by Dhaniswara, et al. (2024), which states that there is a significant relationship between the level of patient knowledge ($p=0.004$; $OR=5.56$; $CI=1.67-17.54$) and behavior ($p=0.04$; $OR=3.19$; $CI=1.04-9.80$) toward cataract occurrence. Other research has also found that there is a relationship between knowledge and the behavior of adolescent girls in dealing with dysmenorrhea with a $p\text{-value} < 0.001$ (Kharmila, M., et al., 2024). The role of hospital management, particularly in Bali Province, is crucial in conducting outreach about case managers and enhancing their role in services, especially Anesthesia and Surgery Services (PAB), thereby increasing knowledge about case managers among nurses and nursing assistants.

Age is associated with nurses' and NAs' knowledge of case managers. The results of this study reveal that age is related to nurses' knowledge of case managers. A person's age can influence their knowledge because as they get older, their comprehension and mindset also develop, thereby increasing their knowledge. As age increases, nurses gain more information at work, become more mature in their thinking, and behave more wisely. This study cannot describe in detail the effect of the availability of information sources on nurses' knowledge about case managers, so further research is still needed. This is in line with the results of a study conducted by (Wahyunadi et al., 2021), which found that there is a significant relationship between age ($p\text{-value} = 0.044$) and anesthetists' knowledge about CPR during the COVID-19 pandemic. The results of this study are also in line with the results of a study conducted by (Sahara, A.S., & Widaningsih, I., 2024), which found that age ($p\text{-value} = 0.028$) affects pregnant women's knowledge about triple elimination examinations. However, different results were found in a study conducted by (Nengah, I., et al., 2020), which revealed that age differences did not affect respondents' knowledge and accuracy of behavior regarding supplement use.

Educational factors are associated with nurses' knowledge of case managers. The results of this study reveal that education is related to nurses' knowledge of case managers. In fact, this study also reveals that nurses with higher education tend to have better knowledge of case managers than nurses with lower education. Education can influence a person's way of thinking. The higher the level of education, the higher the level of knowledge. Education helps a person to think and apply all the information they know and understand. The higher a person's education, the easier it is for them to accept information so that they can expand their knowledge. The results of this study are in line with the results of a study conducted by (Sepang et al., 2013), which found that the level of education ($p=0.041$) was related to the level of knowledge of health workers at the Manado Community Health Center. Another study conducted by (Funna, D.A., et al., 2024) also found that there is a relationship between the mother's level of education and knowledge ($p<0.001$) about Dengue Hemorrhagic Fever (DHF). Meanwhile, the education factor is not associated with NA's knowledge about case managers. This study found that education is not related to NA's knowledge about case

managers. The results of this study are in line with the results of a study conducted by (Tarigan, W.Y.B., et al., 2024), which found that there is no significant relationship between education and the use of Personal Protective Equipment (PPE). This is because education is not the only source of information about case managers. There are many other sources of information that can help someone understand case managers, such as socialization and training about case managers, or even experience working with case managers themselves.

Length of service is also associated with nurses' and NAs' knowledge of case managers. This study found that the length of service of nurses and NAs is related to their knowledge of case managers. A person's length of service can influence knowledge because work experience gained will increase with the length of service in health care. This adequate work experience can help nurses and NAs to develop effective work patterns and solve various problems in providing Nursing Care (ASKEP) and Anesthesia Nursing Care (ASKAN), including working with case managers. The results of this study are in line with research conducted by (Dharmawati, I.G.A., & Wirata, I.N., 2016), which found that there is a relationship between length of service and knowledge of dental and oral health among physical education teachers in elementary schools in the Tampaksiring Gianyar District. The results of this study are also in line with research conducted by (Wahyunadi et al., 2021), which found that there is a significant relationship between length of service ($p\text{-value} = 0.024$) and anesthesia nurses' knowledge of CPR during the COVID-19 pandemic. However, the results of this study are not in line with the research conducted by which revealed that there is no relationship between length of service and nurses' knowledge about the management of nursing care for patients with cardiac decompensation.

CONCLUSION

The correlation test results found that there was a significant relationship between age and length of service with nurses' and NAs' knowledge about case managers. In addition, the education factor also had a significant relationship with nurses' knowledge about case managers. Meanwhile, the education factor did not have a significant relationship with NAs' knowledge about case managers. The education factor was the most dominant factor influencing nurses' knowledge about case managers.

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