

Appendix 1. Glossary

Terminology	Definition
Experience Level	Levels of experience for nursing skills at clinical placement.
Level I	Performed independently.
Level II	Performed with a supervisor.
Level III	Only observed.
Level IV	Not experienced.
Target level	Target levels for nursing skills determined by the Ministry of Health, Labour, and Welfare of Japan.
Level I	Can perform independently.
Level II	Can perform only under supervision.
Level III	Can perform only under exercise situations in school.
Level IV	Only have knowledge.
Achieved level	Students' self-assessment levels for nursing skills after all stipulated clinical placements completed.
Level I	Can perform independently.
Level II	Can perform only under supervision.
Level III	Can perform only under exercise situations in school.
Level IV	Only have knowledge.
Target achievement rate	Proportion of students achieving the target level.
Achievement difficulty rank	Classification of the nursing skills based on target achievement rates.
Skills with easy-to-achieve targets	Nursing skill for which the target achievement rate was more than or equal to 80% in each year.
Skills with neither easy- nor difficult-to-achieve targets	Nursing skill for which the target achievement rate was (1) less than 80% in all examined years and more than or equal to 60% in any year, or (2) more than or equal to 60% in all examined years and less than 80% in any year.
Skills with difficult-to-achieve targets	Nursing skill for which the target achievement rate was less than 60% in all examined years.
Skills with variable target achievement rates	Nursing skill for which the target achievement rate was more than or equal to 80% in any year and less than 60% in any year.

Appendix 2. Nursing skills rated as “skills with difficult-to-achieve targets.”

Nursing skills
Observation of patients receiving tube feedings
Injection of a liquid meal through a nasogastric catheter for a patient
Urination assistance
Excretion assistance and selection of toilets and urinals to suit patients
Providing a range of motion exercise
Oral care of conscious patients
Observation of patients receiving oxygen inhalation therapy
Warming and cooling patients according to their condition
Partial baths, warming, and massage to promote peripheral circulation
Administration of oxygen inhalation therapy
Humidifying the throat
Observation of patients before and after colorectal administration
Colorectal administration to a medical manikin
Seeking assistance from team members in emergency situations
Understanding appropriate urine collection methods and proper handling of urine specimens
Simply measuring blood glucose
Reliable aseptic technique
Preventing needlestick accidents
Following instructions when disaster strikes
Planning for keeping patient's mental comfort

Appendix 3. Differences in achievement difficulty rank before and during the pandemic.

Achievement difficulty rank, N, %	N=141					
	During the pandemic (A)		Before the pandemic (B)		Difference (A-B)	
Skills with easy-to-achieve targets	64	45	81	57	-17	-12
Skills with neither easy- nor difficult-to-achieve targets	57	40	52	37	5	3
Skills with difficult-to-achieve targets	20	14	5	4	15	10
Skills with variable target achievement rates	0	0	3	2	-3	-2

Analysis was conducted for the 141 nursing skills.

"During the pandemic" indicates 2020-2022.

"Before the pandemic" indicates 2017-2019.

The data before the pandemic was obtained in our previous research and published in Notsu et al. (2024).

Notsu et al. Nursing students’ self-assessed level of nursing skills at the time of graduation in a Japanese University: A retrospective observational study. *Asia-Pacific Journal of Oncology Nursing*. 2024; 11 (4) 100400.

Appendix 4. Changes in achievement difficulty rank before and during the pandemic.

Before the pandemic	During the pandemic			
	Skills with easy-to-achieve targets	Skills with neither easy- nor difficult-to-achieve targets	Skills with difficult-to-achieve targets	Skills with variable target achievement rates
Skills with easy-to-achieve targets	64	16	1	0
Skills with neither easy- nor difficult-to-achieve targets	0	38	14	0
Skills with difficult-to-achieve targets	0	0	5	0
Skills with variable target achievement rates	0	3	0	0

The data before the pandemic was obtained in our previous research and published in Notsu et al. (2024).

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Appendix 5. Differences in achievement difficulty rank before and during the pandemic according to category or subcategory.

Types of skills, N, %	Subcategory	Nursing skills N=141	Achievement difficulty rank							
			Skills with easy-to-achieve targets		Skills with neither easy- nor difficult-to-achieve targets		Skills with difficult-to-achieve targets		Skills with variable target achievement rates	
1. Daily life support skills	1. Environmental adjustment skills									
	During the Pandemic	3	3	100	0	0	0	0	0	0
	Before the Pandemic	3	3	100	0	0	0	0	0	0
	2. Dietary support skills									
	During the Pandemic	10	4	40	4	40	2	20	0	0
	Before the Pandemic	10	4	40	5	50	1	10	0	0
	3. Elimination support skills									
	During the Pandemic	13	4	31	7	54	2	15	0	0
	Before the Pandemic	13	5	38	8	62	0	0	0	0
	4. Activity and rest support skills									
	During the Pandemic	14	5	36	8	57	1	7	0	0
	Before the Pandemic	14	9	64	5	36	0	0	0	0
5. Hygiene and bedclothes exchange support skills										
During the Pandemic	15	6	40	8	53	1	7	0	0	
Before the Pandemic	15	9	60	6	40	0	0	0	0	
2. Medical support skills	6. Respiration and circulation support skills									
	During the Pandemic	14	4	29	5	36	5	36	0	0

Before the Pandemic	14	6	43	5	36	2	14	1	7
7. Wound management skills									
During the Pandemic	7	4	57	3	43	0	0	0	0
Before the Pandemic	7	5	71	2	29	0	0	0	0
8. Medication administration skills									
During the Pandemic	25	16	64	7	28	2	8	0	0
Before the Pandemic	25	19	76	6	24	0	0	0	0
9. Emergency medical treatment skills									
During the Pandemic	8	2	25	5	63	1	13	0	0
Before the Pandemic	8	2	25	4	50	0	0	2	25
10. Symptom and biofunctional management skills									
During the Pandemic	14	6	43	6	43	2	14	0	0
Before the Pandemic	14	7	50	6	43	1	7	0	0
11. Infection prevention skills									
During the Pandemic	7	5	71	0	0	2	29	0	0
Before the Pandemic	7	5	71	1	14	1	14	0	0
12. Safety management skills									
During the Pandemic	8	3	38	4	50	1	13	0	0
Before the Pandemic	8	4	50	4	50	0	0	0	0
13. Comfort management skills									
During the Pandemic	3	2	67	0	0	1	33	0	0
Before the Pandemic	3	3	100	0	0	0	0	0	0

The data before the pandemic was obtained in our previous research and published in Notsu et al. (2024).

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Appendix 6. Differences in achievement difficulty rank before and during the pandemic according to target levels.

Target level, N, %	Nursing skills N=141	Achievement difficulty rank							
		Skills with easy-to-achieve targets		Skills with neither easy- nor difficult-to-achieve targets		Skills with difficult-to-achieve targets		Skills with variable target achievement rates	
Level I									
During the Pandemic	34	8	24	18	53	8	24	0	0
Before the Pandemic	34	16	47	18	53	0	0	0	0
Level II									
During the Pandemic	54	23	43	20	37	11	20	0	0
Before the Pandemic	54	28	52	21	39	5	9	0	0
Level III									
During the Pandemic	21	1	5	19	91	1	5	0	0
Before the Pandemic	21	5	24	13	62	0	0	3	14
Level IV									
During the Pandemic	32	32	100	0	0	0	0	0	0
Before the Pandemic	32	32	100	0	0	0	0	0	0

The data before the pandemic was obtained in our previous research and published in Notsu et al. (2024).

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Appendix 7. Differences in achievement difficulty rank before and during the pandemic according to nursing skills with or without a manikin.

With or without a medical manikin, N, %	Nursing skills N=141	Achievement difficulty rank							
		Skills with easy-to-achieve targets		Skills with neither easy- nor difficult-to-achieve targets		Skills with difficult-to-achieve targets		Skills with variable target achievement rates	
With a manikin									
During the Pandemic	15	0	0	14	93	1	7	0	0
Before the Pandemic	15	3	20	9	60	0	0	3	20
Without a manikin									
During the Pandemic	126	64	51	43	34	19	15	0	0
Before the Pandemic	126	78	62	43	34	5	4	0	0

The data before the pandemic was obtained in our previous research and published in Notsu et al. (2024).

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