A Research About the Current Situation of Insulin Injection Provided by Clinical Nurses Under Kap Model on Linzhi, Tibet

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Abstract: *Objective:* to investigate the current situation of insulin injection provided by clinical nurses under KAP(Knowledge-Attitude-Practice) model on Linzhi, Tibet, and to discuss and analyse the influence factors. *Methods:* using a self-design questionnaire a questionnaire about the current situation of insulin injection provided by clinical nurses under KAP model on Linzhi, Tibet to investigate 268 clinical nurses in Linzhi, Tibet, who were chosen through random sampling method, in order to analyse the 'KAP' scoring and the influencing factors. *Results:* The scoring of 'Knowledge' is (65.642±10.313), the scoring of 'Attitude' is (55.478±8.099), the scoring of 'Practice' is (42.493±6.647), the total scoring is (163.612±19.292). The related influence factors, including hospital, department, academic credentials, professional qualifications and whether receiving diabetes specialized training, have statistical significance (*P* value<0.5). *Conclusion:* The KAP of insulin injection provided by clinical nurses in Linzhi, Tibet is on middle level. For nursing managers, it is strongly advised that a normative.

Keywords: Tibet region; Clinical nurse; Insulin injection; Knowledge; Belief and action; Diabetes Preface

In 2017, the number of adult diabetes patients in my country reached 114 million, making it the country with the largest number of patients in the world[1]. At present, insulin replacement therapy can partially improve or restore β-cell function and delay the progress of diabetes[2], which has become one of the important methods for the treatment of diabetes. As the key to the implementation and guidance of standardized insulin injections, nurses' own knowledge and technical level of insulin injection have a significant impact on the effect of insulin therapy[3]. Inadequate knowledge, attitude, and behavior of nurses' insulin injections will affect the blood sugar control and quality of life of diabetic patients. If there are irregular injection techniques, lack of understanding of subcutaneous fat hyperplasia, and failure to provide health guidance. At present, related research on insulin injection KAP, foreign countries mainly focus on the investigation of injection technology for diabetic patients, and there are few studies on nurses. However, there are only a few studies on clinical nurses in economically developed areas in China, and there is a lack of research on nurse groups in western plateau areas. Researchers such as Sang Hongxiashowed that irregular insulin injection techniques can cause adverse reactions such as nodules and infections at the injection site, increase pain at the injection site, and reduce patient compliance with treatment[4]. The purpose of this study is to understand the knowledge, attitude and behavior level of clinical nurses in Linzhi, Tibet, about insulin injection, and to explore the relevant factors, so as to provide a reference for training and guidance in the region.

1 Objects and methods

1.1 Object

In this study, convenience sampling was used to select 8 hospitals in Linzhi, Tibet from March to April 2020. Among them, a total of 268 clinical nurses in 2 tertiary first-class hospitals, 3 second-level hospitals and 3 first-level hospitals were used as research objects. Inclusion criteria: ① Registered nurses in clinical or nursing management positions in Linzhi area; ② Nurses with one year or more of clinical work experience; ③ Agree and voluntarily participate in this study. Exclusion criteria: ① Training and intern nurses; ② Exclude nurses who are not on the job during the investigation; ③ Nurses who are unwilling or unwilling to participate in this investigation due to other factors are excluded.

1.2 Method

1.2.1 "KAP" theory

Knowledge-attitude/belief-practice (KABP/KAP) is generally abbreviated as KAP, which includes the abbreviations of Knowledge, Attitude and Practice. KAP theory believes that people's behavioral changes in health are not achieved in a short period of time, but through long-term The accumulation of knowledge has gradually changed people's cognitive attitudes, thereby contributing to the formation of people's healthy behaviors. Taking KAP theory as the theoretical framework for nurses' insulin injection norms, nurses actively learn about insulin injections, pay attention to factors that may affect clinical insulin injections in their nursing work, and form a positive and correct attitude to insulin injections. Belief guides nurses to inject insulin to patients well in their nursing work, correct inappropriate nursing operations in time, and form reasonable insulin injection behavior.

1.2.2 Survey tools

The "Insulin Injection KAP Questionnaire for Clinical Nurses in Linzhi, Tibet" was formulated based on the opinions of experts in Guangdong and Tibet. The questionnaire mainly includes 4 parts: ① General information of the respondents, including department, hospital level, position, title, education, working years, whether they have participated in diabetes specialist training, etc. ② The clinical nurses' knowledge of insulin injection in Linzhi, Tibet, a total of 20 items. ③ There are 13 items on the attitude of clinical nurses to insulin injection in Linzhi, Tibet. ④ There are 10 items on the insulin injection behavior of clinical nurses in Linzhi, Tibet. This questionnaire is based on the "Interpretation of the 2016 Edition of Chinese Diabetes Drug Injection Technical Guidelines", by consulting library materials, the Internet and electronic literature databases (including China Knowledge Network, Weipu, Pub Med, MEDLINE and Webofscience and other databases)) Related keywords such as "clinical nurse, insulin injection, diabetes, KAP survey theory, questionnaire design" and so on[5].

After consulting and discussing the literature, I designed the questionnaire myself. And based on the opinions of 2 diabetes care experts, 2 Tibet area care experts, and 1 endocrinologist in Guangdong Province, the "Insulin Injection KAP Questionnaire for Clinical Nurses in Linzhi, Tibet" was repeatedly revised and formed. The overall Cronbach'sα of the questionnaire was 0.960, of which Cronbach'sα was 0.955 for 20 items in knowledge, Cronbach'sα was 0.970 for 13 items in attitude, and Cronbach'sα was 0.955 for 10 items in behavior. The questionnaire uses the Likert 5-level scoring method, with items assigned from high to low (5 to 1 points). The total scores of knowledge, attitude and behavior are 100 points, 65 points, and 50 points respectively, and the total score of the questionnaire is 43-215 points. The score is calculated according to the percentile system. Standard score=average score/total score×100%, and KAP score is calculated[6]. Excellent>full score×85%, poor<full score×60%, good is between the two[6]. The higher the score, the higher the nurse's knowledge, attitude and behavior of insulin injection.

1.2.3 Investigation method

The electronic questionnaire was used to survey the active nurses in Linzhi, Tibet, and one mobile terminal was restricted to fill in the questionnaire once to avoid repeated surveys; the questionnaire was filled in anonymously, and the questionnaire was returned within 5 days from the date of issuance, and the answer was eliminated. The questionnaire is consistent and logically contradictory. A total of 293 questionnaires were submitted and 268 valid questionnaires were returned. The effective response rate of the questionnaires was 91.46%.

1.2.4 Statistical methods

SPSS20.0 statistical software was used to analyze the survey data, measurement data was expressed as ($\chi \pm s$), data comparison was made by one-way analysis of variance, counting data was expressed by the number of cases and percentage (%), and multiple linear stepwise regression analysis and other statistical methods were used. For statistical analysis, $P<0.05$ or $P<0.01$ indicates that the data difference is statistically significant.

2 Results

2.1 General situation of the research subjects

The study included 268 nurses, 240 in tertiary hospitals, 12 in second-level hospitals, and 16 in first-level hospitals; among them, 36 had participated in diabetes training and 232 had not participated in diabetes training. See Table 1 for other conditions.

2.2 Comparison of insulin injection KAP scores of clinical nurses in Linzhi, Tibet with different characteristics.

There is no statistical difference in the KAP scores of nurses from different departments, hospitals, positions, titles, education, working years, and whether they have participated in diabetes training, and the knowledge of insulin injection Dimension score (65.642±10.313), attitude dimension score (55.478±8.099), behavior dimension score (42.493±6.647) and total score (163.612±19.292), in the department of the nurse, hospital level, nurse position, nurse title, working years There are significant differences in the scores of nurses' knowledge, beliefs, and behavior in terms of education background, whether to participate in diabetes specialist training ($P<0.05$), see Table 2.

2.3 Insulin injection knowledge, attitude, behavior scores and the 5 items with the lowest scores are shown in Table 3.

Table 1. General data analysis of survey subjects (N=268)

Project and classification	count / Proportion	classification	count / Proportion (%)
Department		title	
internal medicine	68(25.37)	nurse	92(34.33)
Surgery	20(7.46)	Nurse	140(52.24)
Obstetrics and Gynecology Department	32(11.94)	Nurse in charge	36(13.43)
pediatrics	24(8.96)	education	
Department of critical care	4(1.49)	secondary specialized school	8(2.99)
Emergency Department	24(8.96)	junior college	167(62.31)
other	96(35.82)	undergraduate	93(34.7)
Hospital level		post	
one level	16(5.97)	nurse	196(73.13)
second level	12(4.48)	Nursing team leader	24(8.96)
three level	240(89.55)	Head nurse	36(13.43)
Have you ever participated in diabetes knowledge training		Nursing manager	12(4.48)
yes	36(13.43)	Working years(a)	

Table 2. Comparison of insulin injection KAP and demand scores of nurses with different characteristics (N=268, $\bar{x} \pm s$, points)

Project	n	Knowledge score	Attitude score	Behavior score	KAP Total score
Department					
internal medicine	68	71.33±8.14	56.33±9.90	42.67±7.24	170.33±22.34
other	96	64.92±11.67	55.17±8.16	41.46±6.59	161.54±20.48
pediatrics	24	66.65±10.38	59.06±6.15	45.41±4.68	171.12±13.60
Surgery	20	64.00±5.77	52.20±9.52	42.60±7.33	158.80±20.50
Obstetrics and Gynecology Department	32	62.88±9.86	55.50±7.59	42.75±5.61	161.13±17.39
Emergency Department	24	66.00±8.69	50.33±5.20	38.33±9.00	154.67±19.44
Department of critical care	4	60.00±0.00	44.00±0.00	39.00±0.00	143.00±0.00
F		2.13	6.50	4.70	4.66
P		0.05	0.000**	0.000**	0.000**
Hospital level					
three level	240	73.00±7.59	57.00±5.61	41.75±4.58	171.75±6.59
second level	12	47.67±8.28	57.67±5.00	35.67±2.99	141.00±9.50
one level	16	66.05±9.59	55.27±8.35	42.88±6.71	164.20±19.45
F		26.84	0.80	7.16	10.47
P		0.000**	0.45	0.001**	0.000**
post					
nurse	196	66.65±9.59	55.35±8.43	42.10±6.82	164.10±19.82
Director of nursing department / Deputy director	12	56.67±17.06	57.67±5.00	37.33±5.21	151.67±23.90
Nursing team leader	24	71.83±4.98	57.33±6.48	47.67±3.62	176.83±5.64
Head nurse	36	59.00±9.28	54.22±7.98	42.89±5.71	156.11±14.93
F		13.08	1.02	8.13	7.68
P		0.000**	0.385	0.000**	0.000**
title					
Nurse in charge	36	60.78±8.79	52.56±7.74	42.33±5.51	155.67±17.68
nurse	92	67.57±11.04	54.74±8.36	41.22±7.49	163.52±21.86
senior nurse	140	65.63±9.82	56.71±7.82	43.37±6.21	165.71±17.40
F		5.81	4.47	2.97	3.97
P		0.003**	0.012*	0.053	0.020*
education					
secondary specialized school	8	57.50±2.67	50.00±11.76	39.50±3.74	147.00±18.17
junior college	160	64.74±10.11	55.35±8.35	42.25±7.45	162.34±20.48
undergraduate	93	67.96±10.54	56.18±7.14	43.18±5.05	167.32±16.04
F		5.66	2.22	1.43	5.21
P		0.004**	0.11	0.242	0.006**
Working years					
1-5years	104	67.31±9.73	54.42±8.06	41.46±7.15	163.19±20.80
6-10years	84	66.00±11.18	59.24±6.79	43.95±5.89	169.19±17.11
11-20years	52	63.08±10.17	53.92±7.69	43.00±6.30	160.00±16.53
21-30years	24	62.83±9.72	49.50±8.38	39.83±6.68	152.17±20.60
31years and above	4	65.00±0.00	60.00±0.00	48.00±0.00	173.00±0.00
F		1.99	10.28	3.49	4.84
P		0.097	0.000**	0.009**	0.001**
Diabetes training					
yes	36	72.67±8.39	57.44±7.36	44.00±4.80	174.11±14.72
no	232	64.55±10.17	55.17±8.18	42.26±6.87	161.98±19.43
F		20.72	2.47	2.15	12.86
P		0.000**	0.118	0.144	0.000**

Table 3. Insulin injection knowledge, attitude, behavior scores and the 5 items with the lowest scores (*N*=268)

entry	Average score of items ($\bar{x} \pm s$)	Scoring rate (%)
knowledge		
K2. Each commonly used insulin dosage form and its injection route	3.00±0.67	60
K3. The onset and duration of each insulin dosage form	2.97±0.69	59.4
K5. Absorption characteristics of insulin in different tissues	2.81±0.70	56.1
K13. The requirements of children, adults and teenagers on the length of needle	2.97±0.81	59.4
K14. Needle selection and injection related techniques in patients with gestational diabetes mellitus	2.81±0.80	56.1
attitude		
A1. Master the action time of insulin	4.21±0.77	84.2
A2. Master all kinds of insulin injection methods	4.24±0.74	84.7
A3. Operating procedures of various insulin pens	4.15±0.78	78.2
A10. Pay attention to the psychological disorders of patients at the beginning of injection	4.14±0.73	83.3
A11. It can recognize subcutaneous fat hyperplasia	4.16±0.75	83.3
behavior		
P5. Observe the injection site after injection	4.21±0.77	84.2
P7. Regular rotation is needed to guide patients to inject	4.16±0.75	83.3
P8. Guide the patients to stay long enough after injection, and there should be no overflow at the injection site	4.18±0.85	83.6
P9. Instruct patients to rewarm their insulin before injection	4.1±0.88	81.2
P10. Instruct the patient to keep the pen in use at room temperature	4.1±0.87	81.5

Table 4. Assignment method of independent variable of factors affecting KAP of insulin injection

Independent variable	Assignment method
Department	internal medicine =1,Surgery =2,Obstetrics and Gynecology Department =3,pediatrics =4,Department of critical care =5,Emergency Department =6,other =7
Hospital level	First class hospital =1,Secondary hospital =2,Tertiary hospital =3
Post	nurse =1,Nursing team leader =2,Head nurse =3,Director of nursing department / Deputy director =4
Professional title	nurse =1,senior nurse =2,nurse in charge =3
Working years	1-5years =1,6-10years =2,11-20years =3,21-30years =4,31 Years and above =5
Education	secondary specialized school =1,junior college =2,undergraduate =3
Have you received diabetes related training	no =0,yes =1

Table 5. Multiple stepwise regression analysis of insulin injection KAP (*N*=268)

Independent variable	B	SE	Beta	*t*	*p*
Constant	153.52	10.82	-	14.20	0.000**
Department	-2.57	0.74	-0.20	-3.49	0.001**
Hospital level	-11.06	3.49	-0.19	-3.17	0.002**
Post	0.66	1.05	0.04	0.63	0.528
Professional title	4.00	1.75	0.15	2.29	0.023*
Working years	0.62	0.67	0.06	0.92	0.357
Education	5.28	2.17	0.14	2.43	0.016*
Have you received diabetes related training	13.66	3.24	0.24	4.21	0.000**

Note: R^2=0.19, Adjustment R^2=0.16, *F*=8.49, *P*=0.000.

2.4 Insulin injection KAP multivariate analysis for clinical nurses

The total KAP questionnaire related to insulin injection was divided into dependent variables, and variables with statistical differences in univariate analysis were used as independent variables to perform multiple stepwise regression analysis. This study included single-factor statistically different variables The independent variables include department, hospital level, position, professional and technical title, working years, education, and whether they have received relevant training in diabetes. The assignment of independent variables is shown in Table 4, and the results of multiple stepwise regression analysis are shown in Table 5.

3 Discussion

3.1 The knowledge level of insulin injection for clinical nurses in Linzhi, Tibet needs to be improved. The results of this study show that the knowledge score rate of insulin injection for clinical nurses in Linzhi, Tibet is 65.6%, and the knowledge dimension standard is (65.642±10.313), which is at a medium to low level, low Clinical nurse in a tertiary general hospital in Hunan Province and a clinical nurse in Guangdong Province[3,7].

The reasons for the analysis are: In recent years, diabetes blood glucose control and insulin treatment programs have been updated rapidly, and patients' needs for obtaining the latest health information are increasing day by day, and the knowledge and work experience of nurses in the past are difficult to be qualified for current diabetes care[8]. In addition, the concept of nurses in Tibet is outdated, knowledge is not updated in time, and there is a lack of motivation for continuing education; in addition, the education level of nurses in the region is relatively low, and there are relatively few opportunities for nurses to go out for continuing education and training[9]. It can be seen from Table 1 that only 13.43% of nurses have received diabetes-related training, and whether to participate in diabetes training is positively correlated with the knowledge dimension score ($P<0.01$). This study shows that internal medicine nurses, as a nursing team leader, nurses' titles, and undergraduate degree knowledge are better ($P<0.01$ or $P<0.05$); the possible reason is that internal medicine nurses have more exposure to diabetic patients than non-internal medicine nurses, and their experience and training opportunities are relatively high. There are many, frequent doctor rounds and case discussions, and more opportunities to exchange diabetes care experience and gain new knowledge; the nursing team leader assumes a major position in clinical practice and nursing, and requires a solid theoretical foundation and practice Ability; the general job title of nurses in Linzhi, Tibet is low, and in this research survey, only 13% of the titles are in charge of nurses or above; with the reform of higher education examinations in China, the nursing profession becomes more scientific, and the more highly educated nurses receive education and training More and more perfect theoretical knowledge[10].

It can be seen from Table 2 that the nurses in Linzhi, Tibet are very sensitive to "the characteristics of insulin absorption by different tissues", "needle selection and injection related technologies for gestational diabetes patients", "onset and duration of each insulin formulation", and "children, adults, and adolescents The knowledge of "needle length requirements" and "every common insulin dosage form and its injection route" is particularly weak. It can be seen that nurses in Linzhi area lack knowledge of insulin injections and do not have the knowledge of systemic insulin injections, so they urgently need to strengthen their learning.

3.2 Insulin injection attitude of clinical nurses in Linzhi, Tibet is at a medium level The results of this study show that the knowledge score rate of insulin injection for clinical nurses in Linzhi, Tibet is 85.35%, and the attitude dimension standard is (55.478±8.099), which is at a medium to high level. The item with the lowest score in the attitude dimension is "operating procedures of various insulin pens". 23.88% of nurses think it is only generally important. The possible reason is that the operation of insulin pen is a routine clinical operation with high familiarity and simple process, which is considered important The sex is relatively low.

Research by Wang Hongmin *et al*. shows that standardizing the operation process of using insulin pens can improve work efficiency and increase patient satisfaction[11]. In addition, "concern about the psychological disorders of patients at the initial injection stage", "can identify subcutaneous fat hyperplasia", "master the duration of action of various insulins and injection methods" are relatively low. Some patients with initial insulin injections have resistance and resistance, and lack of awareness of insulin injections, which leads to a certain degree of fear[12]. The blood glucose psychological stress response will affect the secretion of islet cells through the autonomic nervous system and affect the patient's blood glucose level [13]; Therefore, it is especially important to pay attention to the patient's psychological condition.

3.3 Insulin injection behavior of clinical nurses in Linzhi, Tibet is at a moderate level. The results of this study show that the score rate of insulin injection by clinical nurses in Linzhi, Tibet is 84.98%, and the behavioral dimension standard is (42.493±6.647), which is at a moderately high level. Lower than the clinical nurse of the third-level general hospital in Hunan Province[3].

The results of this study show that most nurses cannot properly instruct insulin patients. 1.49% of nurses have never instructed patients to stay for enough time after injection, there is no liquid overflow at the injection site, and instruct patients to refrigerate insulin before injection needs to be rewarmed and Instruct patients to store the pen in use at room temperature. After most patients were discharged from the hospital, due to lack of self-management ability, nurses did not provide standardized health guidance, resulting in recurring diseases and even diabetes-related complications, resulting in aggravation of the disease[14]. Therefore, the nurses' insulin injection behavior was standardized and the nursing management department strengthened quality control. It is imperative to improve and implement the insulin injection operation and health education training system of nursing staff.

4 Summary

To sum up, the clinical nurses in Linzhi, Tibet have an intermediate level of insulin injection KAP. Therefore, it is suggested that clinical nursing managers should actively obtain new concepts and new developments in diabetes care, formulate standardized training plans for the problems of clinical nurses in insulin injections, and actively implement them, use the resources of the Tibetan medical team to help, and send key nursing staff out. Further study or specialist study, actively carry out in-hospital training and academic exchanges, develop specialist nursing talents for diabetes in Linzhi area, and build a complete diabetes care management system. The deficiency of this study is to investigate the insulin injection KAP of clinical nurses in Linzhi, Tibet. The amount of data collected is limited by regional factors, and can only partially reflect the cognition, attitude and behavior of clinical nurses in Linzhi, Tibet on insulin injection; in addition, The clinical nurses' knowledge and operation of insulin injection were not investigated on the spot, and the objectivity of the research results was insufficient. In future research, we still need to expand the sample size, conduct field visits to clinical nurses, and deepen the investigation of insulin injection KAP for clinical nurses in Tibet from multiple dimensions, so as to facilitate the development of diabetes care management guidance for clinical nurses in Linzhi, Tibet In the end, it can further improve the level of insulin injection KAP for clinical nurses in Linzhi area.

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