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Current application of in-hospital information glucose monitoring system in Jiangsu

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Abstract: Objective To investigate the application of in-hospital information blood glucose monitoring system (IGMS) in Jiangsu and the satisfaction of medical staff to use IGMS. **Methods** From August 2021 to July 2022, a survey was conducted among medical staff in 119 secondary and tertiary hospitals in Jiangsu Province. The survey included questions on the application status of IGMS, such as the year of initiation and the medical units using it, and the satisfaction with the use of IGMS in medical staff was investigated by a 5-level Likert scale. **Results** (1) Utilization rate of IGMS: among the 119 hospitals, 58 (48.7%) utilized IGMS. The utilization rate in Southern Jiangsu (61.0%) was significantly higher than that in Northern Jiangsu (34.8%) and Northern Jiangsu (37.8%) (χ^2=7.113, P=0.029). (2) Distribution of medical units using IGMS: utilization rate in internal medicine department (96.6%) was significantly higher than that in surgical department (51.7%) and ICU (39.7%) (χ^2=44.550, P<0.01), with the highest utilization rate observed in endocrinology department (96.6%). (3) Satisfaction survey: the satisfaction scale had a Cronbach's alpha of 0.70 and a KMO value of 0.74, and Bartlett's sphericity test yielded a χ^2 value of 298.26 (P<0.01). Two initial factors with eigenvalues greater than 1 accounted for 72.5% of the variance. Following a scree plot analysis, two factors were extracted, and the items were deleted according to the reliability and validity, and the satisfaction scale containing two factors and seven items was finally determined. Ninety-seven medical staff completed the scale with a score of 29.0 (25.5, 31.0). There was no significant difference in personal satisfaction with IGMS among medical staff in different regions, hospitals of grades and professional(P>0.05). **Conclusion** The utilization rate of IGMS in secondary and tertiary hospitals in Jiangsu is approximately 48.7%, with a higher rate in Southern Jiangsu. Endocrinology departments have the highest rate of IGMS usage. Medical staff are satisfied with the use of IGMS, and put forward higher expectations for the stability of networking and the standardization of training.

Keywords: Information glucose monitoring system; Blood glucose data; Real-time display; Cloud sharing; Blood glucose management; Regional distribution; Distribution of medical units; Satisfaction

Fund program: Social Development Project of Jiangsu Provincial Key Research and Development Plan (BE2023774);Nanjing Association for Science and Technology "Soft Science Research" Project (2023-40)

In recent years, the prevalence of diabetes in China has shown a continuous upward trend, increasing from 0.9% in 1980 to 12.8% in 2018 [1-3]. The management of diabetic patients faces significant challenges. Blood glucose control is closely related to the occurrence and development of diabetic complications and adverse outcomes during hospitalization [4-7]. Blood glucose monitoring is a crucial aspect of diabetes management. Traditional methods involve manual recording of blood glucose levels on paper records, which suffer from disadvantages such as data entry errors, omissions, inconvenient storage, and difficulties in data sharing [8-9]. The Information Glucose Monitoring System (IGMS) integrates networked blood glucose meters, management servers, Hospital Information Systems (HIS), and data display terminals, enabling real-time display of blood glucose data and cloud-based sharing [10]. Many studies have used IGMS to assess inpatient blood glucose control levels and establish in-hospital blood glucose management systems. They have found that IGMS can reduce recording errors, improve blood glucose control, and enhance work efficiency [11-15]. Currently, the application status and pros and cons of IGMS in various regions and levels of hospitals within Jiangsu Province are not clearly understood. This study investigates the application of IGMS in secondary and tertiary hospitals in Jiangsu Province, aiming to provide a theoretical basis for improving diabetes management and refining blood glucose management models.

1 Materials and methods

1.1 Survey objects

(1) Participating units: From August 2021 to July 2022, a survey was conducted in 119 secondary and tertiary hospitals across Jiangsu Province, covering 109 tertiary hospitals and 10 secondary hospitals in 13 prefecture-level cities with varying economic development levels in Southern Jiangsu, Central Jiangsu, and Northern Jiangsu. The division into Southern Jiangsu,

Central Jiangsu, and Northern Jiangsu is based on the "Jiangsu Statistical Yearbook 2022" published by the Jiangsu Provincial Bureau of Statistics [16]. Southern Jiangsu includes Nanjing, Wuxi, Changzhou, Suzhou, and Zhenjiang; Central Jiangsu includes Nantong, Yangzhou, and Taizhou; Northern Jiangsu includes Xuzhou, Lianyungang, Huai'an, Yancheng, and Suqian. According to the "Guiding Principles for Medical Institution Planning (2021-2025)" issued by the National Health Commission, hospitals are classified into provincial-level, municipal-level, and county-level. (2) Satisfaction survey: Among hospitals using IGMS, a total of 97 medical staff participated in the survey.

1.2 Survey methods

The survey was conducted using electronic questionnaires.

(1) Current blood glucose management: types of blood glucose meters, year of IGMS implementation, departments using IGMS. (2) Establishment of IGMS satisfaction scale using a 5-point likert scale (**Table 1**), requiring respondents to select one of the following options for each question: strongly agree, agree, neutral, disagree, strongly disagree. Scores for items expressing advantages of IGMS were assigned as follows: Strongly agree (5 points), agree (4 points), neutral (3 points), disagree (2 points), strongly disagree (1 point). Scores for items expressing disadvantages of IGMS were reverse-scored: strongly agree (1 point), agree (2 points), neutral (3 points), disagree (4 points), strongly disagree (5 points).

1.3 Statistical methods

SPSS 26.0 software was used for data analysis. Due to the skewed distribution of scores on the scale, represented as $M\ (P_{25},\ P_{75})$, Kruskal Wallis H were employed for multiple comparisons, and Bonferroni correction was applied for pairwise comparisons. Counts were presented as case (%), and differences between groups were assessed using the χ^2 test. The reliability and validity of the satisfaction scale were evaluated using Cronbach's α coefficient and factor analysis. A significance level of $P<0.05$ was considered statistically significant.

2 Results

2.1 Basic information of survey units and personnel

A total of 119 hospitals and 97 medical staff participated in the survey. **See Table 2.**

2.2 Utilization of IGMS in hospitals

Among the 119 surveyed hospitals, 58 (48.7%) reported using IGMS. Among them, the utilization rates of IGMS in county-level hospitals and hospitals at the municipal level and above were 50.0% (29/58) and 47.5% (29/61), respectively, with no significant difference ($\chi^2=0.072$, $P=0.789$). IGMS was used in 36 (61.0%), 8 (34.8%), and 14 (37.8%) hospitals in southern, central, and northern Jiangsu, respectively, with a significant difference between regions ($\chi^2=7.113$, $P=0.029$), with the highest rate of use in southern Jiangsu. Among the hospitals using IGMS, the utilization rate of internal medicine (96.6%) was significantly higher than that of surgery (51.7%) and ICU (39.7%) ($\chi^2=44.550$, $P<0.001$), and endocrinology (96.6%) had the highest utilization rate.

2.3 Satisfaction scale analysis

2.3.1 Reliability and validity analysis

Descriptive statistics for each item were shown in **Figure 1.** Items " Unstable networking and easy data loss," "complex operation procedures," and "repeated training required for personnel changes" had lower average scores and higher standard deviations compared to other items. The Cronbach's α coefficient for the satisfaction scale was 0.702, Kaiser-Meyer-Olkin (KMO) measure was 0.742, and Bartlett's test of sphericity yielded $\chi^2=298.268$ ($P<0.01$). Initial factor analysis identified two factors with eigenvalues greater than 1, contributing to a cumulative variance of 72.522%. Retention of two factors based on scree plot analysis indicated correlations above 0.5 between all items and their respective factors.

Tab.1 IGMS user satisfaction scale

Questions	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
What do you think are the advantages of an information-based blood glucose meter					
Q1：Ability to detect high and low blood sugar in a timely manner					
Q2：Ability to reduce data errors					
Q3：Able to improve work efficiency					
Q4：Convenient for quality control					
What do you think are the disadvantages of an information-based blood glucose meter					
Q5：Unstable networking and easy data loss					
Q6：Complex operation procedures					
Q7：Repeated training required for personnel changes					

2.3.2 Satisfaction evaluation

The distribution of respondents achieving scores of 4 or higher on each item was depicted in **Figure 1**, showing higher proportions for Q1-Q4 compared to Q5-Q7. Overall satisfaction scores did not significantly differ among medical staff from different regions, administrative levels, or professional titles regarding IGMS ($P>0.05$) **(Table 3)**

Tab.2 Basic information of the surveyed units and medical staff [case(%)]

Surveyed units （*n*=119）		**Medical staff（*n*=97）**	
Hospital level		Job	
Tertiary hospitals	109（91.6）	Doctor	61（62.9）
Secondary hospitals	10（8.4）	Nurse	36（37.1）
Region		Professional title	
Southern Jiangsu	59（49.6）	Senior	79（81.4）
Central Jiangsu	23（19.3）	Intermediate	12（12.4）
Northern Jiangsu	37（31.1）	Junior	6（6.2）
Organization level		Region	
Provincial-level	11（9.3）	Southern Jiangsu	67（69.1）
Municipal-level	50（42.0）	Central Jiangsu	13（13.4）
County-level	58（48.7）	Northern Jiangsu	17（17.5）
		Organization level	
		Provincial-level	15（15.5）
		Municipal-level	40（41.2）
		County-leve	42（43.3）

Tab. 3 Comparison of satisfaction in medical staff [point, *n*=97,*M* (P_{25}, P_{75})]

Indicator	**Score** [$M(P_{25}, P_{75})$]	***H***	***P***
Job		0.058	0.810
Doctor	29.0（25.0，31.5）		
Nurse	29.0（26.0，31.0）		
Professional title		0.976	0.614
Senior	29.0（26.0，31.0）		
Intermediate	28.0（25.5，30.0）		
Junior	29.0（23.8，29.8）		
Region		0.190	0.909
Southern Jiangsu	29.0（26.0，31.0）		
Central Jiangsu	29.0（24.5，33.0）		
Northern Jiangsu	30.0（24.5，32.5）		
Organization level		0.876	0.349
Municipal-level and above	29.0（25.0，31.0）		
County-level	29.0（26.0，32.0）		

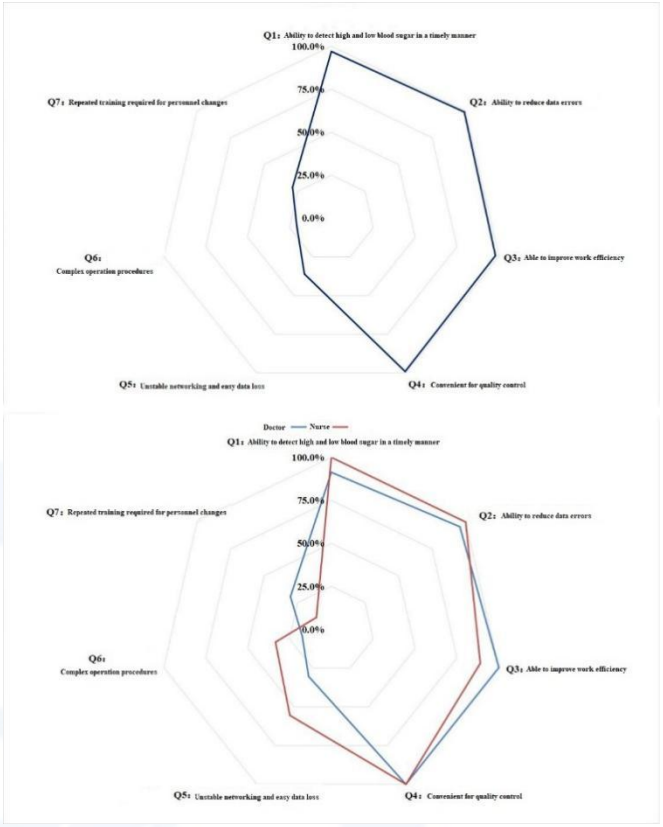

Fig.1 Composition of scores above 4 for each item

3 Discussion

In recent years, information management systems have rapidly developed across various medical fields, supporting the prevention, treatment, and optimization of processes for numerous diseases [17-18]. Studies have shown that IGMS, as a management tool for diabetes blood glucose monitoring, can improve glucose control, reduce medical errors, enhance testing efficiency, and improve clinical outcomes [11-15]. This study first reported the use of IGMS in secondary and tertiary hospitals within Jiangsu Province, China. Currently, approximately 48.7% of hospitals in Jiangsu Province utilize information management systems for blood glucose. The highest usage rates were observed in Southern Jiangsu (61.0%). Economic development levels in different regions of Jiangsu Province, as indicated in the "Jiangsu Statistical Yearbook 2022," may influence the adoption of IGMS. Variations in departmental adoption may lead to potential medical safety hazards [19]. Maximizing the clinical utility of IGMS requires active participation from clinical and functional departments to provide standardized, stable, and efficient high-glucose diagnostic and treatment procedures. An increasing number of hospitals recognize the importance of "informationization" in blood glucose management and actively participate in establishing blood glucose information platforms, making it possible to establish a "provincial public blood glucose data platform."

The feasibility of using the questionnaire to assess medical staff satisfaction with IGMS was validated through reliability and validity testing. The study found no significant differences in IGMS satisfaction scores among medical staff from different regions, administrative levels, or professional titles. The total questionnaire score was 35, with most satisfaction scores ranging from 26 to 28, indicating overall satisfaction among the majority of medical staff with IGMS. Descriptive statistics for individual items indicated areas for improvement in IGMS regarding network stability, operational complexity, and training processes. Application of 5G network technology can enhance network stability; integration of networked glucose meters and PDA devices can simplify testing procedures; establishment of an IGMS management team within hospitals and instructional video guides on operational procedures can enhance training efficiency and diversity among testing personnel. Future efforts should focus on widespread application of IGMS to identify shortcomings and make improvements to establish an efficient, stable, and accurate blood glucose management tool.

Limitations of this study include: (1) potential recall bias in the questionnaire survey method; (2) lack of data on inpatient prevalence rates of hyperglycemia and medical costs, limiting further analysis of clinical benefits associated with IGMS applications.

The utilization rate of IGMS in Jiangsu Province's hospitals is increasing, with higher adoption rates observed in economically developed regions and broader usage within internal medicine departments. The main current drawbacks and application bottlenecks of IGMS are likely unstable networking, complex operational procedures, and training challenges. As an informationized and intelligent management tool for diabetes, IGMS requires further promotion and adoption.

The authors report no conflict of interest

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·论　著·

江苏地区院内信息化血糖监测技术应用现况调查

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摘要：目的　调查江苏地区院内信息化血糖监测系统（IGMS）的应用情况和医护人员使用 IGMS 满意度。**方法**　通过问卷于 2021 年 8 月至 2022 年 7 月调研了江苏省内共 119 家二、三级医院的医护人员，调研内容：IGMS 应用情况包括启用年份、使用医疗单元等；医护满意度，应用 5 分级 Likert 标度法建立满意度量表，调研医护使用 IGMS 满意度。**结果**　（1）IGMS 使用率：119 家省内医院中有 58 家医院（48.7%）使用 IGMS，IGMS 使用率苏南医院（61.0%）显著高于苏中（34.8%）和苏北医院（37.8%）（$\chi^2=7.113$，$P=0.029$）。（2）使用 IGMS 的医疗单元分布：内科（96.6%）显著高于外科（51.7%）及 ICU（39.7%）（$\chi^2=44.550$，$P<0.01$），内分泌科（96.6%）使用率最高。（3）满意度调查：满意度量表的克仑巴赫 α 系数为 0.702，KMO 值为 0.742，Bartlett 球形检验的 χ^2 值为298.268（$P<0.01$）。有 2 个初始因子特征值大于 1，累计贡献率为 72.5%。根据碎石图提取 2 个因子，按照信效度进行题项删减，最终确定包含 2 个因子、7 个题项的满意度量表。97 名医护人员完成量表填写，得分 29.0（25.5，31.0）。不同地区、不同等级医院、不同职称医护对 IGMS 的个人满意度差异无统计学意义（$P>0.05$）。**结论**　江苏地区二、三级医院 IGMS 使用率约为 48.7%，苏南地区使用率较高。在使用 IGMS 的医院中，内分泌科 IGMS 使用率最高。医护人员使用 IGMS 的满意度良好，对联网稳定性及培训规范化提出了更高的期待。

关键词：信息化血糖监测系统；血糖数据；实时显示；云端共享；血糖管理；地区分布；医疗单元分布；满意度

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Current application of in-hospital informatized glucose monitoring system in Jiangsu

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Abstract: Objective　To investigate the application of in-hospital informatized blood glucose monitoring system (IGMS) in Jiangsu and the satisfaction of medical staff to use IGMS. **Methods**　From August 2021 to July 2022, a survey was conducted among medical staff in 119 secondary and tertiary hospitals in Jiangsu Province. The survey included questions on the application status of IGMS, such as the year of initiation and the medical units using it, and the satisfaction with the use of IGMS in medical staff was investigated by a 5-level Likert scale. **Results**　(1) Utilization rate of IGMS: among the 119 hospitals, 58 (48.7%) utilized IGMS. The utilization rate in Southern Jiangsu (61.0%) was significantly higher than that in Central Jiangsu (34.8%) and Northern Jiangsu (37.8%) ($\chi^2=7.113$, $P=0.029$). (2) Distribution of medical units using IGMS: utilization rate in internal medicine department (96.6%) was significantly higher than that in surgical department (51.7%) and ICU (39.7%) ($\chi^2=44.550$, $P<0.01$), with the highest utilization rate observed in endocrinology department (96.6%). (3) Satisfaction survey: the satisfaction scale had a Cronbach's alpha of 0.702 and a KMO value of 0.742, and Bartlett's sphericity test yielded a χ^2 value of 298.268

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(P<0.01). Two initial factors with eigenvalues greater than 1 accounted for 72.5% of the variance. Following a scree plot analysis, two factors were extracted , and the items were deleted according to the reliability and validity, and the satisfaction scale containing two factors and seven items was finally determined. Ninety-seven medical staff completed the scale with a score of 29.0 (25.5, 31.0). There was no significant difference in personal satisfaction with IGMS among medical staff in different regions, hospitals of grades and titles (P>0.05). **Conclusion** The utilization rate of IGMS in secondary and tertiary hospitals in Jiangsu is approximately 48.7%, with a higher rate in Southern Jiangsu. Endocrinology departments have the highest rate of IGMS usage. Medical staff are satisfied with the use of IGMS, and put forward higher expectations for the stability of networking and the standardization of training.

Keywords: Informatized glucose monitoring system; Blood glucose data; Real-time display; Cloud sharing; Blood glucose management; Regional distribution; Distribution of medical units; Satisfaction

Fund program: Social Development Project of Jiangsu Provincial Key Research and Development Plan (BE2023774); Nanjing Association for Science and Technology "Soft Science Research" Project (2023-40)

近年来,中国糖尿病患病率呈持续增长趋势,由1980 年的 0.9%攀升至 2018 年的 12.8%[1-3],糖尿病患者的管理面临巨大挑战。血糖控制情况与糖尿病并发症的发生发展和住院不良结局密切相关[4-7]。血糖监测是糖尿病管理的重要环节,传统血糖检测后人工记录于纸质记录单上,存在数据错记漏记、记录不便留存和数据共享困难等缺点[8-9]。信息化血糖监测系统(informatized glucose monitoring system, IGMS)整合了联网血糖仪、管理服务器、医院信息化系统(hospital information system, HIS)及数据显示终端,实现血糖数据的实时显示及云端共享[10]。国内外许多研究运用 IGMS 评估住院患者血糖控制水平并建立院内血糖管理体系,发现其可以减少记录差错、改善血糖控制、提升工作效率[11-15]。目前,江苏省内各地域、各等级医院对 IGMS 的应用情况及其优缺点尚不明确。本研究对江苏省内二、三级医院的 IGMS 应用情况进行调查,以期为提高糖尿病管理水平、改良血糖管理模式提供理论依据。

1　对象与方法

1.1　*调研对象*　(1) 参与单位:2021 年 8 月至 2022 年 7 月调研了江苏省内共 119 家二三级医院,涵盖苏南、苏中、苏北不同经济发展水平 13 个设区市的 109 家三级医院、10 家二级医院。苏南、苏中、苏北的划分依据江苏省统计局编著的《江苏统计年鉴 2022》[16],南京、无锡、常州、苏州及镇江为苏南地区,南通、扬州及泰州为苏中地区,徐州、连云港、淮安、盐城及宿迁为苏北地区。根据国家卫生健康委印发的《医疗机构设置规划指导原则(2021-2025 年)》,医院层级分为省级、市级、县级医院。(2) 满意度调研:在使用 IGMS 的医院中,共有 97 名医护人员参与调研。

1.2　*调研方式*　通过电子问卷形式进行调研。(1) 血糖管理现状:血糖仪类型,启用 IGMS 年份、应用 IGMS 科室;(2) 使用 5 分级 Likert 标度法建立 IGMS 满意度量表,要求受访者对于设定的问题(见表 1 所列)在以下选择中给出 1 项选择:非常同意、同意、一般、不同意、非常不同意(每个问题对应此 5 项选择)。对于表达 IGMS 优点的题项赋分如下:非常同意(5 分)、同意(4 分)、一般(3 分)、不同意(2 分)、非常不同意(1 分)。对于表达 IGMS 缺点的题项反向赋分:非常同意(1 分)、同意(2 分)、一般(3 分)、不同意(4 分)、非常不同意(5 分)。

1.3　*统计学方法*　使用 SPSS 26.0 软件进行数据分析。因量表总分为计量资料且呈偏态分布,故用 $M(P_{25},P_{25})$ 表示,多组比较使用 Kruskal-Wallis H 检验,两两比较使用 Bonferroni 法。计数资料以人数(%)表示,组间差异比较使用 χ^2 检验。满意度量表采用克仑巴赫 α 系数(Cronbach α coefficient)和因子分析进行量表的信效度检验。P<0.05 为差异有统计学意义。

2　结　果

2.1　*调研单位及人员基本资料*　119 家医院及 97 名医护人员参加并接受了本次调研,详见表 2。

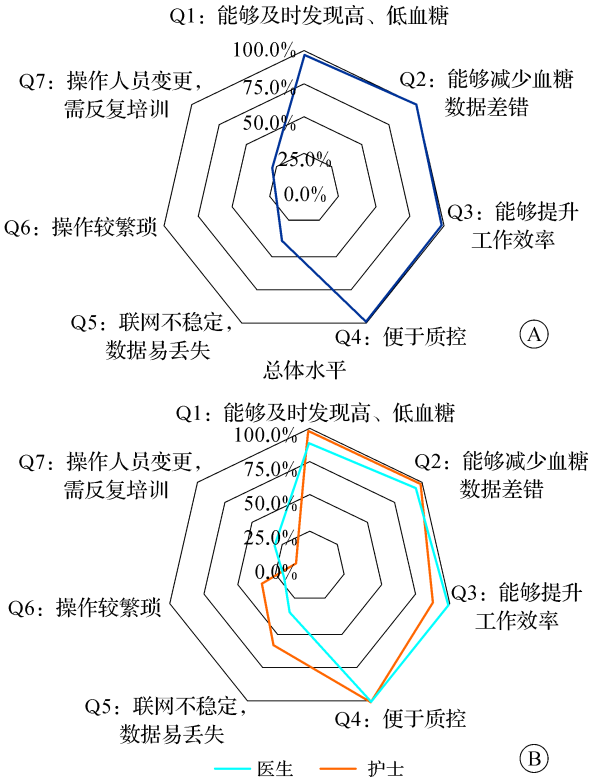
2.2　*医院 IGMS 应用情况*　119 家调研医院中,共有 58(48.7%)家医院使用 IGMS。其中,县级医院、市级及以上医院的 IGMS 使用率分别为 50.0%(29/58)和47.5%(29/61),无显著差异(χ^2 = 0.072, P = 0.789)。苏南、苏中、苏北分别有 36/59(61.0%)、8/23(34.8%)、14/37(37.8%)家医院使用 IGMS,不同区域存在显著差异(χ^2 = 7.113, P = 0.029),苏南地区使用率最高。在使用 IGMS 的医院中,内科(96.6%)使用率显著高于外科(51.7%)及 ICU

(39.7%)(χ^2 = 44.550, P < 0.01),内分泌科(96.6%)使用率最高。

2.3　满意度量表分析

2.3.1　信效度分析　各题项的描述性统计见图 1,“联网不稳定,数据易丢失”、“操作较繁琐”以及“操作人员变更,需反复培训”的 3 个题项得分均数低于其他题项,标准差高于其他题项。经计算,满意度量表的克仑巴赫 α 系数为 0.702,量表 Kaiser-Meyer-Olkin(KMO)值为 0.742,Bartlett 球形检验的χ^2 值为 298.268(P<0.01)。有 2 个初始因子特征值大于 1,累计贡献率为 72.5%。根据碎石图保留 2 个因子后进行因子分析,可见所有条目与自身因子的相关系数均大于 0.5。

2.3.2　满意度评价　各项得 4 分及以上的人数构成比见图 1,可见 Q1~Q4 的题项高得分人数占比较 Q5~Q7 高。不同辖区、不同属地、不同职称医护对 IGMS 的个人满意度总得分差异无统计学意义(P>0.05)(表 3)。



注:A 为总体水平;B 为医生、护士各自水平。

图 1　各题项得分 4 分以上的构成

Fig. 1　Composition of scores above 4 for each item

表 1　IGMS 使用满意度量表的问题

Tab. 1　Promblems in IGMS user satisfaction scale

问题	问题
您认为信息化血糖仪的优点是	您认为信息化血糖仪的缺点是
Q1:能够及时发现高、低血糖	Q5:联网不稳定、数据易丢失
Q2:能够减少数据差错	Q6:操作较繁琐
Q3:能够提升工作效率	Q7:操作人员变更,需反复培训
Q4:便于质控	

表 2　接受调研单位、医护人员基本资料　[人数(%)]

Tab. 2　Basic information of the surveyed units and medical staff　[case(%)]

医院数量(n=119)		医护人数(n=97)	
按照等级划分		按照岗位划分	
三级医院	109(91.6)	医生	61(62.9)
二级医院	10(8.4)	护士	36(37.1)
按照区域划分		按照职称划分	
苏南医院	59(49.6)	高级职称	79(81.4)
苏中医院	23(19.3)	中级职称	12(12.4)
苏北医院	37(31.1)	初级职称	6(6.2)
按照举办层级划分		按照医院区域划分	
省级医院	11(9.3)	苏南医院	67(69.1)
市级医院	50(42.0)	苏中医院	13(13.4)
县级医院	58(48.7)	苏北医院	17(17.5)
		按照医院层级划分	
		省级医院	15(15.5)
		市级医院	40(41.2)
		县级医院	42(43.3)

表 3　医护满意度比较　[分, n=97, $M(P_{25},P_{75})$]

Tab. 3　Comparison of satisfaction in medical staff　[point, n=97, $M(P_{25}, P_{75})$]

项目	量表总分	H 值	P 值
按岗位分组			
医生	29.0(25.0,31.5)	0.058	0.810
护士	29.0(26.0,31.0)		
按职称分组			
高级职称	29.0(26.0,31.0)		
中级职称	28.0(25.5,30.0)	0.976	0.614
初级职称	29.0(23.8,29.8)		
按医院区域分组			
苏南医院	29.0(26.0,31.0)		
苏中医院	29.0(24.5,33.0)	0.190	0.909
苏北医院	30.0(24.5,32.5)		
按医院层级分组			
市级及以上	29.0(25.0,31.0)	0.876	0.349
县级医院	29.0(26.0,32.0)		

3　讨　论

近年来,信息化管理模式在各个医疗领域迅速发展,为众多疾病的防治以及诊疗流程的优化提供了有力支持[17-18]。研究显示,IGMS 作为糖尿病血糖监测的管理工具,可以改善血糖控制、减少医疗差错、提高检测效率并改善临床结局[11-15]。本研究在国内首次报道了江苏省内二三级医院 IGMS 的使用情况。目前,江苏省内医院信息化血糖管理模式的应用率大约为 48.7%,苏南地区医院使用率较高,为 61.0%。根据《江苏统计年鉴 2022》,苏南、苏中、苏北的区域规划主要依据经济发展水平,提示地区经济发展状况可能是 IGMS 推广的影响因素之一。院内不同科室血糖管理模式不相同,可能导致医疗安全隐患[19]。发挥 IGMS 的最大临床效用需要全院临床科室、职能科室的共同参与,为患者提供标准、稳定、高效的高血糖诊疗流程。越来越多的医院意识到血糖管理“信息化”的重要性,并积极参与血糖信息化平台的建立,使“全省公共血糖数据平台”的建立成为可能。

通过验证问卷的信效度,证明了运用该量表评估医护对 IGMS 的满意度具有可行性。研究显示,在不同地区,不同属地以及不同职称的情况下,医护人员对 IGMS 的满意度评价没有显著性差异。问卷的总分为 35 分,而满意度总分大多在 26~28 分,提示大部分医护人员对 IGMS 较为满意。单项题目的评分描述性统计提示,IGMS 在联网稳定性、操作流程复杂性和操作流程培训上仍存在不足。5G 网络技术的应用可以提高网络连接的稳定性;整合了联网血糖仪和 PDA 的一体机概念,可有效简化检测流程;院内 IGMS 管理团队的建立及操作流程的视频指南可增强检测人员的培训效率及多样性。未来,需要更广泛的应用 IGMS,发现其缺点并加以改进,以求建立一种高效、稳定、精准的血糖智能化管理工具。

本研究的局限性在于:(1) 问卷调研方法存在一定的回忆偏倚;(2) 未调查住院患者高血糖患病率和医疗费用等数据,无法进一步分析 IGMS 应用相关的临床获益。

江苏省内医院的 IGMS 使用率逐渐增多,经济较发达地区使用率更高,内科应用更广泛。联网不够稳定、操作流程复杂以及操作流程培训可能是 IGMS 目前的主要缺点和应用瓶颈。作为糖尿病的信息化、智能化管理工具,IGMS 的应用有待进一步普及推广。

利益冲突　无

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