

Monitoring Endocrine Nursing in South Asia (MENSA)

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Abstract

Background: South Asian countries face the colossal challenge of tackling the massive burden of diabetes and other endocrine disorders. These patients grossly outnumber the specialists trained to deal with these conditions. A trained cadre of diabetes specialist nurses (DSN) and endocrine specialist nurses (ESN) might help bridge this gap. Exploring the perception of DSN/ESN among South Asian doctors will help to understand their role, responsibilities and future prospects. **Methods:** One hundred and seventy-four endocrinologists from South Asia participated in an online survey on their perception of DSNs and ESNs. **Results:** Out of the 174 respondents, 61 (35%) were currently working with DSN/ESN, 79 (45.4%) had worked in the past and 131 (75.2%) were willing to start recruiting or employ additional DSN/ESN in the future. The majority considered that the primary function of DSN and ESN is to educate on diabetes (n = 86, 96.6%) and endocrine disorders (n = 34, 57.6%), respectively, followed by anthropometry and initial work-up. Only a small minority felt they could write independent follow-up prescriptions (nurse-led clinics) [DSN - 16 (18%) and ESN - 3 (5.1%)]. Graduation with a certificate course in diabetes and basic endocrinology was considered a sufficient qualification by 68 (39.1%) respondents. Endocrinologists from countries other than India were more willing to recruit ESN/DSN in the future (89.7% vs 72.4%; $P < 0.03$) and approve a nurse-led clinic (62.1% vs 29.7%; $P < 0.03$). Upon multiple logistic regression, working in countries other than India was an independent predictor of future willingness to work with DSN/ESN (odds ratio (OR): 4.48, 95% confidence interval (CI) 1.09–18.43, $P = 0.03$). **Conclusion:** DSN and ESN could facilitate the management of healthcare-seekers with diabetes and endocrine disorders. A certification course to train nurses on diabetes and basic endocrine disorders following graduation could be helpful. Major hindrances in creating a regular cadre of DSN/ESN were limited opportunities for career progression and lack of additional remuneration for services.

Keywords: Diabetes education, diabetic nurses, endocrine nurses, South Asia

INTRODUCTION

The prevalence of diabetes is on the rise worldwide. Approximately, 537 million adults (20-79 years) are living with diabetes. The total number of people living with diabetes is projected to rise to 643 million by 2030 and 783 million by 2045. About 3 in 4 adults with diabetes live in low- and middle-income countries (LMIC) where the prevalence is increasing most rapidly.^[1] This rising incidence reflects the epidemiological shift, which is characterized by growing urbanization and adverse changes in food and lifestyle.^[2] In the context of South Asia

where all countries in the region are categorized as LMICs, diabetes is a rising cause of death: it has moved from the 15th to the 9th leading cause of death and the number of deaths from this disease has nearly doubled since 2000.^[3] In addition to an

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epidemiological shift, several factors such as increased visceral obesity, insulin resistance, reduced β -cell function and a genetic predisposition to diabetes, lead to a significantly high risk of developing diabetes among South Asians.^[4]

Lack of resources, tight healthcare budgets, low medical reimbursement and socioeconomic variables are major barriers to effective management of diabetes in South Asian countries.^[5] The ratio of physicians per 1000 population in South Asia is 0.8:1000 which is below the World Health Organization (WHO) recommended norm of 1:1000.^[6] Health systems must evolve to offer the collaborative care required to treat diabetes and the related comorbidities as more individuals develop diabetes in LMICs that already carry a significant burden of infectious illnesses. It is necessary to explore new translational approaches that are realistic, affordable, scalable and appropriate for South Asian nations with limited resources to combat the huge burden of diabetes.

Nursing is one field that can help bridge this gap in diabetes care. A cadre of competent diabetes specialist nurses (DSN) and endocrine specialist nurses (ESN) can help to address the huge deficit of specialized doctors trained to manage diabetes and other endocrine conditions in South Asian countries.

The definition and role of nurses have evolved over time as a result of the scientific progress and increasing span of healthcare. This evolution is evidenced by the varied models and specializations in nursing care.^[7] Individualizing therapy in contemporary medicine is essential to deliver quality healthcare.^[8] The new roles assigned to the nurses arise from the changes in modern medicine and place them in a pivotal position to offer quality care. Thus, skilled nursing faculty having specialization in different aspects of healthcare is a necessity for holistic improvement in health.^[8,9]

In addition to the core values of nursing, competency in specialized aspects of endocrinology and diabetes is necessary for optimal care. Society for Endocrinology Competency Framework defines competence as ‘a state of having knowledge, judgement, skills, energy, experience and motivation required to respond adequately to the demands of one’s professional responsibilities’.^[10]

To achieve this expertise, a structured training programme to create competent DSN and ESN is the need of the hour. The first step before any such intervention is to define the baseline parameters. Determination of the baseline is essential and it requires two pertinent questions to be answered - ‘what do we need’ and ‘where do we stand’. The current study was undertaken to understand the demand and deficiency of DSN and ESN in South Asia.

METHODS

Participants and data collection

The Monitoring Endocrine Nursing in South Asia (MENSA) survey is a cross-sectional study to gauge the perceived role of ESN and DSN among endocrinologists in South Asia. This

information can be useful for a standard training programme for ESN and DSN. The electronic questionnaire was shared electronically with endocrinologists practicing in South Asia. Participation was voluntary and after obtaining informed consent.

The survey

We designed a survey containing 30 questions to gauge the perceived role of nurses in endocrine and diabetes care. A team of four endocrinologists validated the survey. The questionnaire was divided into four sections. Demographics, including age, gender and place of practice were the focus of the first section. The second section enquired about the experience, if any, of working with a diabetic specialist nurse. The experience of working with an ESN was assessed in the third section. The fourth section studied perceptions regarding future of endocrine nursing in South Asia.

Statistical analysis

Continuous data are presented as mean and standard deviation (SD), while categorical variables are presented as numbers (percentages). To compare parameters between the two groups, we did the Chi-square test for categorical variables and independent *t*-test for quantitative variables or equivalent nonparametric tests as appropriate. Multiple regression analysis was done to identify independent predictors for willingness to recruit DSN/ESN in the future. A *P*-value of <0.05 was considered statistically significant. All statistical analysis was performed using IBM SPSS Statistics 20 Windows (SPSS Inc., Chicago, USA).

RESULTS

Demographic characteristics of respondents

A total of 174 responses were recorded from endocrinologists across South Asian countries, of whom the majority, *n* = 145 (83.3%) were from India. A total of 34 respondents (19.4%) had study or work experience outside the South Asian countries, either in developed nations (UK/US/Australia/NZ/Canada) (*n* = 24, 13.7%) or the Middle East or other South Asian hospitals or clinics (*n* = 10, 5.7%). The mean age was 43.1 years (SD: 7.86) and the average number of years of endocrinology practice was 9.7 years (SD: 7.42). The baseline demographic characteristics of the respondents are summarized in Table 1. While 61 (35.06%) are currently working with DSN/ESN, 131 respondents (75.29%) are willing to start recruiting DSN/ESN or employ additional DSN/ESN in the future to help with their clinical practice.

Perceptions about the functions of DSN and ESN

There were 61 (35.1%) respondents who were currently working with a DSN/ESN and 79 (45.4%) respondents who had previously worked with a DSN/ESN. Their opinions were analysed regarding the functions performed by a DSN/ESN (*n* = 89 for DSN and *n* = 59 for ESN).

The most common role performed by the DSN was diabetic education including insulin education, foot care,

Table 1: Demographic characteristics of respondents

Parameter	n (%) or mean (SD)
Age (years)	43.07 (7.8)
Gender (Male:Female)	105:69
Country	
India	145 (83.3%)
Nepal	3 (1.7%)
Sri Lanka	3 (1.7%)
Bangladesh	15 (8.6%)
Pakistan	4 (2.3%)
Afghanistan	3 (1.7%)
Others	1 (0.6%)
Years of Endocrinology practice	9.76 (7.4)
Type of attachment	
Govt Teaching Hospital with Speciality Training	45 (25.9%)
Govt Teaching Hospital without Speciality Training	6 (3.4%)
Private Teaching Hospital with Speciality Training	37 (21.3%)
Private Teaching Hospital without Speciality Training	24 (13.8%)
Solo private clinic	31 (17.8%)
Private Corporate Hospital without Speciality Training	28 (16.1%)
Group practice	3 (1.7%)
Current affiliation	
Professor	20 (11.5%)
Associate Professor	14 (8%)
Assistant Professor	19 (10.9%)
Senior Consultant	37 (21.3%)
Consultant	65 (37.4%)
Self-Employed	15 (8.6%)
Senior Resident	4 (2.3%)
Experience of working abroad	34 (19.4%)
Speciality Training done in Western Hospital (UK/US/Australia/NZ/Canada)	15 (8.6%)
More than 1 year at Western Hospital/Clinic (UK/US/Australia/NZ/Canada)	4 (2.3%)
Less than 1 year at Western Hospital/Clinic (UK/US/Australia/NZ/Canada)	5 (2.9%)
More than 1 year at Middle East Asian/other South Asian Hospital/Clinic	7 (4%)
Less than 1 year at Middle East Asian/other South Asian Hospital/Clinic	3 (1.7%)
Whether working with DSN/ESN currently	61 (35.1%)
Whether worked with DSN/ESN in the past	79 (45.4%)
Whether willing to recruit a DSN/ESN or additional nurses in clinical practice?	131 (75.3%)

*n=number, SD=Standard Deviation, DSN=Diabetes Specialist Nurse, ESN=Endocrine Specialist Nurse, UK=United Kingdom, US=United States of America, NZ=New Zealand

etc. (n = 86, 96.6%) followed by anthropometry and vitals measurement (n = 58, 65.1%) and telephonic contact with patients (n = 57, 64%). Only 16 respondents (18%) said their DSN could write a repeat prescription for follow-up patients (nurse-led clinics) [Table 2]. For the ESN, the most common function was endocrine education (n = 34, 57.6%) followed by initial patient work-up (n = 32, 54.2%). Only three respondents (5.1%) said they would allow their nurses to independently prescribe medicines for follow-up cases. The majority (n = 35, 40.7%) believe that the DSN handles 10–20% of their clinical job load, while seven respondents (8.1%) thought they handle >50% of their job load. A total of 23.3% of respondents believe that around 20% of their job load is handled by the ESN and only three respondents (5.27%) opined that >50% of their clinical workload is handled by the ESN.

Financial remuneration and career opportunities of DSN and ESN

The majority of the DSN (44.1% of DSN and 40.4% of ESN) were receiving standard salaries as per the prevailing nursing scale (government or corporate hospital), while 13.1% of DSN and 10.5% of ESN were receiving additional incentives. Their charges were mostly borne by the institute as fixed salaries or included in the clinic consultation or visit fees. Only 9.2% of the DSN and 3.5% of the ESNs received standard per visit DSN/ESN charges. A total of 42.1% of ESN and 31.4% of DSN had yearly assessments with increments in pay/perks. However, up to 38.38% of the DSNs and 29.83% of ESNs had no known opportunities for career progression [Supplementary Table 1].

Perceptions about the future of ESN/DSN

Perceptions about the future of DSN/ESN among endocrinologists from South Asian countries are elaborated

Table 2: Clinical roles of a DSN and an ESN

	<i>n</i> (%)
Functions performed by a DSN (<i>n</i> =89)	
Initial Patient work-up	49 (55.1%)
Foot Assessments	42 (47.2%)
Diabetic Education including Insulin Education/Foot care	86 (96.6%)
Repeat Prescription for follow-up patients (Nurse-led clinic)	16 (18%)
Diet Planning and Education	53 (59.6%)
Insulin Dose adjustments	41 (46.1%)
Insulin Pump monitoring	20 (22.5%)
Telephone Contact with patients	57 (64.1%)
Anthropometry/Vitals measurement	58 (65.2%)
Clinical Trial Recruitment	20 (22.5%)
Percentage of Clinical load handled by DSN?	
<10%	11 (12.8%)
10-20%	35 (40.7%)
21-30%	20 (23.3%)
31-40%	11 (12.8%)
41-50%	2 (2.3%)
>50%	7 (8.1%)
Functions performed by an ESN (<i>n</i> =59)	
Initial Patient work-up	32 (54.2%)
Anthropometry/Vitals	40 (67.8%)
Endocrine Assessment	11 (18.6%)
Endocrine Education	34 (57.6%)
Independent prescribing for follow-up patients	3 (5.1%)
Stimulation and Suppression tests	22 (37.3%)
What percentage of your Clinical load does your ESN handle?	
<10%	17 (29.8%)
10-20%	17 (29.8%)
21-30%	15 (26.3%)
31-40%	4 (7%)
41-50%	1 (1.8%)
>50%	3 (5.3%)

**n*=number of respondents, DSN=Diabetes Specialist Nurse, ESN=Endocrine Specialist Nurse

in Table 3. A total of 131 (75.3%) respondents said they were willing to recruit a DSN/ESN or additional nurses to help them in the immediate future. The majority (*n* = 56, 32.2%) were willing to recruit one nurse trained in both diabetes and endocrinology, while 44 respondents (25.3%) wanted to recruit one DSN and one ESN; *n* = 30 (17.2%) wanted to recruit >2 nurses while only 8 (4.6%) wanted to recruit an ESN alone. Only 38 (21.8%) respondents wanted DSN and ESN to be separate as in the West, while the majority (*n* = 136, 78.2%) believed these two roles could be combined. Regarding the necessary qualification, most of the respondents (*n* = 68, 39.1%) opted for a graduation degree (BSc. nursing) with some training in diabetes and basic endocrinology as the educational qualification required for a DSN/ESN while only two respondents thought a master's degree in nursing (MSc. nursing) is essential. As high as 112 respondents (64.4%) think there is a need for a certification/fellowship course in endocrinology and diabetes for nurses after graduation.

A total of 61 (35.1%) respondents said they would approve of DSN/ESN prescribing repeat prescriptions for patients who come for follow-up visits.

Comparison between countries

The majority of respondents were from India (*n* = 145, 83.3%). A higher proportion of endocrinologists from South Asian countries other than India were willing to recruit ESN/DSN for their clinical help in the future (89.7% vs 72.4%, *P* < 0.03) and would approve of DSN/ESN writing repeat prescriptions for follow-up patients or having a nurse-led clinic (62.1% vs 29.7%, *P* < 0.03). The majority of Indian endocrinologists compared to other countries believe that the role of DSN and ESN might be combined (81.4% vs 62.1%, *P* = 0.02) [Table 4].

Comparing the roles of DSN and ESN

On comparing the perceptions of endocrinologists about DSN and ESN, no differences were noted in the percentage workload shared by DSN or ESN, mode and amount of remuneration and career progression opportunities between the two groups ($\chi^2 = 7.87, 3.81, 4.82$ and $1.92, P > 0.1$, respectively).

Comparison between those working with DSN/ESN and those who are not

Those currently working with DSN/ESN (*n* = 61) had a significantly higher number of years of endocrinology practice (12.16±/− 8.5 vs 8.47±/− 6.45 yrs, *P* = 0.003), higher chances of having worked or studied outside the South Asian countries (32.8% vs 12.4%, *P* = 0.002) and having worked with DSN/ESN in the past (78.7% vs 27.4%, *P* < 0.001).

Predictors of working or willingness to work with DSN

We tried to find predictors of working with DSN/ESN using logistic regression. We found that past experience of having worked with a DSN/ESN was the sole independent predictor for working with DSN/ESN (OR: 8.29, CI: 3.77–18.24, *P* < 0.001) though age, country of work, years of practice, type of attachment (government/private/both) or having trained/ worked abroad were not significant predictors in a model including all these variables.

Upon multiple logistic regression for future willingness to work with an ESN/DSN, in a model adjusted for age, number of years of practice, type of attachment (government/private/both), experience of having trained/worked abroad and past experience of having worked with DSN/ESN, we found that the country of work (India vs other countries) was an independent predictor, with working in South Asian countries other than India having a significantly higher probability for future willingness to work with an DSN/ESN (OR: 4.48, CI 1.09–18.43, *P* = 0.03).

DISCUSSION

In the current survey, we looked at the perceptions of 174 endocrinologists from India and other South Asian countries about the role and future of DSN and ESN. We found that 34.85% of respondents were currently working

Table 3: Perceptions about the future of DSN/ESN among endocrinologists from South Asian countries

	<i>n</i> (%)
How many new nurses are required to help you in your work?	
One each (DSN and ESN)	44 (25.3%)
One (trained in both)	56 (32.2%)
>2 Nurses	30 (17.2%)
One (DSN only)	36 (20.7%)
One (ESN only)	8 (4.6%)
What do you think the basic qualification for a DSN/ESN should be?	
BSc Nursing	16 (9.2%)
MSc Nursing	2 (1.1%)
BSc Nursing with a standard fellowship from ESI	53 (30.5%)
BSc Nursing with some training in Diabetes	68 (39.1%)
MSc Nursing with speciality fellowships	16 (9.2%)
GNM (General Nursing and Midwifery)	19 (10.9%)
Do you think DSN and ESN roles can be combined?	136 (78.1%)
Do you think there is a need for new certification/fellowship courses in Endocrinology and Diabetes for nurses in India?	112 (64.4%)
What do you think the remuneration of a DSN/ESN should be?	
Basic Existing BSc Nursing/MSc Nursing pay scale in Govt Setting	30 (17.2%)
Existing Pay Scale as in your city as in other private hospitals	46 (26.4%)
25% of the treating physician	36 (20.7%)
50% of the treating physician	11 (6.3%)
Same as the treating physician	1 (0.6%)
Pay based on the number of patients seen/billable procedures done	30 (17.2%)
Will you approve of DSN/ESN prescribing follow-up/repeat prescriptions (nurse-led clinic) if regulatory approvals are obtained?	61 (35.1%)

**n*=number of respondents, DSN=Diabetes Specialist Nurse, ESN=Endocrine Specialist Nurse, BSc=Bachelor in Science, MSc=Master in Science, Govt=Government

Table 4: Comparison of responses from India and other South Asian countries

Parameter	India (<i>n</i> =145)	Other countries (<i>n</i> =29)	<i>P</i>
Whether trained/worked outside South Asian countries	20 (13.8%)	14 (48.3%)	<0.001
Current affiliation			0.25
Professor	20 (13.8%)	0	
Associate Professor	11 (7.6%)	3 (10.3%)	
Assistant Professor	14 (9.7%)	5 (17.2%)	
Senior Consultant	33 (22.8%)	4 (13.8%)	
Consultant	51 (35.2%)	14 (48.3%)	
Self-employed	13 (9%)	2 (6.9%)	
Senior Resident	3 (2.1%)	1 (3.4%)	
Currently working with DSN/ESN	49 (33.8%)	12 (41.4%)	0.523
Worked with DSN/ESN in the past	62 (42.8%)	17 (58.6%)	0.153
Willing to recruit DSN/ESN in the future	105 (72.4%)	26 (89.7%)	0.034
Number of nurses willing to recruit in the future			0.011
One each (DSN and ESN)	32 (22.1%)	12 (41.4%)	
One (trained in both)	51 (35.2%)	5 (17.2%)	
>2 Nurses	21 (14.5%)	9 (31%)	
One (DSN only)	34 (23.4%)	2 (6.9%)	
One (ESN only)	7 (4.8%)	1 (3.4%)	
Role of DSN and ESN can be combined	118 (81.4%)	18 (62.1%)	0.024
There is a need for a national Endocrine Society-approved course for nurses to be trained as DSN/ESN	128 (88.3%)	27 (93.1%)	0.744
DSN/ESN can be allowed to write repeat prescriptions for follow-up patients (Nurse-led clinic)	43 (29.7%)	18 (62.1%)	0.001

**n*=number of respondents, DSN=Diabetes Specialist Nurse, ESN=Endocrine Specialist Nurse

with a DSN/ESN and 45.4% had previously worked with a DSN/ESN. Those who had past work experience with a

DSN/ESN were likely to be working with a DSN/ESN at present. As high as 75.29% were planning to start recruiting

a DSN/ESN or recruit additional DSN/ESN to help in their clinical practice.

A clinical nurse specialist could serve the roles of a consultant, educator, collaborator, researcher, patient advocate and play a key role in maintaining doctor-patient liaison at the same time.^[11] As per the results of our survey, the functions performed by the DSN were mostly educating patients on diabetes management (96.63%) or endocrine education (57.63%).

In 2022, there were around 33.41 lakh registered nursing personnel in India, including 23,40,501 registered nurses, accounting for around 1.96 nurses per 1,000 population in the country.^[12] The figures are similar in other South Asian countries, though Nepal and Sri Lanka have better nurse: population ratios of 3.1 and 2.2, whereas the ratio is low for Bangladesh (0.4), Afghanistan (0.4) and Pakistan (0.6).^[6]

South Asians run a high risk of developing type 2 diabetes, with India alone accounting for 77 million people living with diabetes, and the number is expected to increase to 134.2 million by 2045.^[13] The prevalence is also high in other South Asian countries, though there is considerable heterogeneity across the countries.^[14] More than one million deaths can be directly or indirectly attributed to diabetes and its complications in India.^[15]

In India and most other South Asian countries, diabetes management is chiefly undertaken by the treating endocrinologist or physician. But, it has long been recognized that a concerted and multidisciplinary approach is necessary for tackling the diabetes pandemic and preventing the rising prevalence of diabetes-associated complications. In this regard, the American Diabetes Association (ADA) recommends a key role of Diabetes Self-Management Education and Support (DMSE/S) which focusses on self-management, clinical outcomes, health status and quality of life of the patients and diabetes education plays a vital role in the successful implementation of DMSE/S.^[16] International bodies like the International Diabetes Federation have called for more and better-trained nurses to address multiple challenges in diabetes prevention and care.^[17] India has very few certification courses for diabetic educators and the dearth of trained diabetes educators in India further increases the burden on physicians. The number of registered dietitians is also low in South Asian countries and many of them are unfamiliar with the implementation of evidence-based nutrition practice guidelines.^[18] Also, diabetes educators and nutritionists are often not available easily in the primary care settings which is the first point of contact between patients and the health system. Primary healthcare facilities provide both routine and more complex diabetes care. It is important to develop an approach for effective and efficient joint collaboration between primary care workers and specialists, a role that DSNs can take up.^[19]

Nurses specialized in the management of diabetes thus is the need of the hour as they could deliver the right, evidence-based care with regard to diabetes education including foot care,

diet and exercise planning along with performing their usual duties of initial patient work-up. Studies have shown diabetes education by nurses to be a significant predictor of achieving optimal glycaemic control, defined as HbA1c <7.0%, even after controlling for DM duration.^[20] Nurse practitioners present accurate, basic nutrition information, reinforcing nutrition advice from dietitians and reemphasizing the importance of lifestyle change and follow-up on their patients' progress with nutrition interventions.^[21] Also, following appropriate training, they could help in insulin dose adjustments and insulin pump monitoring. In densely populated developing countries, maintaining telephonic contact with patients and sometimes rendering digital prescriptions or oral advice form an important part of holistic patient care and prevent discontinuation of patient follow-up. A DSN/ESN can also take up this duty diligently.

There were no perceived differences in the percentage workload, remuneration and career progression opportunities between a DSN and an ESN. Most of the endocrinologists from South Asian countries (78.16%) believed that the roles of a DSN/ESN can be combined instead of having separate DSN and ESN, and this was true, especially for Indian endocrinologists.

Studies from speciality endocrine clinics coordinated by nurses have shown improvement in patient outcomes for children with short stature.^[22] ESNs, with the support of the Society for Endocrinology, have developed competency frameworks for adult endocrine nursing in several endocrine disorders like benign adrenal tumours, hypoparathyroidism and hyperparathyroidism, osteoporosis and polycystic ovary syndrome to empower endocrine nurses.^[23] Hormonal stimulation tests like the insulin tolerance test are safely and effectively performed by experienced ESNs without medical supervision.^[24] However, doing stimulation or suppression tests need close supervision and is fraught with risks. The function of ESN would be mostly focussing on endocrine education rather than doing clinical examination, suppression/stimulation tests or prescribing medications.

In our survey, graduation in nursing with some form of speciality training in diabetes was perceived as a sufficient educational qualification for a DSN/ESN. Very few felt there was a need for a master's degree in nursing to become a DSN/ESN. This is equivalent to a clinical nurse specialist, rather than an advanced nurse practitioner or a nurse consultant in the UK.^[11] Some countries have undertaken endocrinology speciality training programmes for primary care nursing students to train them in the management of complex diabetes mellitus and basic endocrine conditions.^[25] Since most of the patients with diabetes or endocrine diseases are chronic patients rather than acute emergencies, short courses to train nurses with bachelor's degrees, in the earlier-mentioned aspects of diabetes management would be an efficient and cost-effective strategy for healthcare improvement in South Asian countries.

The role of nurses has evolved to a great extent, from being the doctor's hand-maiden to a coworker to a totally autonomous

profession in the present day with nurse-led clinics successfully managing several chronic diseases in the Western countries.^[11] In our survey, we found current work experience with a DSN/ESN and working in South Asian countries other than India were independent predictors for preference for a nurse-led clinic among endocrinologists. Endocrinologists belonging to South Asian countries other than India were more likely to approve of a nurse-led clinic than Indian endocrinologists. This group also included a high proportion of doctors who have worked or trained in the West or Middle East countries where DSN/ESN play an important role in the management of diabetes and endocrine diseases in many hospitals, though training abroad alone was not found to significantly predict preference for a nurse-led clinic. Prior studies on the role of nurse-led clinics in delivering integrated diabetes care revealed several barriers including regional disparities in access to specialist resources, lack of formal uniform protocols, a deficit of specialist staff like endocrinologists, unstructured education and issues with integration.^[26] While a nurse-led clinic might reduce the physician's burden, especially while managing diabetes patients, the short-term and long-term consequences of this strategy, including patient concerns and acceptability in South Asian countries, remain an interesting area for future research.

The majority of the DSN/ESN were receiving standard salaries as per the prevailing Nursing Scale (government or corporate hospital), mostly as a fixed salary from the institute with/without incentives. A small proportion received per visit DSN/ESN charges. A vast majority had no opportunity for career progression though many ESNs underwent yearly assessments with increments in pay/perks. Most of the physicians felt that the DSN/ESN should receive remuneration equivalent to the existing pay scale or a per-patient payment. The DSN/ESN needs to have options for career progression. In a qualitative study on DSNs in the UK, the main challenges faced were increased workload, shortage of staff, lack of recognition and support and financial dissatisfaction.^[27] A survey conducted among nurses from South Asian countries could throw more light on their perspectives and concerns about a career as a DSN/ESN in the future.

Our study had the limitations of a questionnaire-based survey with limited representation from endocrinologists belonging to South Asian countries other than India. The nursing courses and structure of healthcare facilities are heterogeneous in the different countries, but the questions were framed primarily keeping the Indian healthcare infrastructure in mind.

CONCLUSION

Our study is the first study on the perception of endocrinologists on the role and future of DSN and ESN in South Asian countries. While the need for ESNs seems to be evolving, DSNs can aid in multiple aspects of diabetes management and share the burden of endocrinologists. A certification course to train nurses after graduation, on diabetes and basic endocrine disorders is necessary for DSN/ESN.

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Conflicts of interest

There are no conflicts of interest.

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Supplementary Table 1: Financial remuneration of DSN and ESN

	<i>n</i> (%)
How are your patients charged for DSN services (<i>n</i> =87)	
Charges included in the Clinic Consultation/Visit Fees	40 (46%)
Variable charges as per DSN services utilized	10 (11.5%)
Govt Setup/Charitable Setup – So No charges	29 (33.3%)
Standard per visit DSN charges	8 (9.2%)
How much do you or your institution pay the DSN (<i>n</i> =85)	
Fixed salary plus incentives	11 (13.1%)
Standard Salary as above plus additional remuneration for extra hours/work done	5 (6%)
Fixed salary	30 (35.7%)
Standard salary as per the prevailing Nursing Scale (Govt or Corporate hospital)	37 (44.1%)
Variable Salary depending on income and patients seen	1 (1.2%)
Do the DSNs that work with you have opportunities for career progression?	
Unaware of any career progression	33 (38.4%)
Regular promotions based on expertise and additional skills obtained	17 (19.8%)
Yearly assessments and increments in pay/perks	27 (31.4%)
Periodic negotiation of pay and perks	9 (10.5%)
How are your patients charged for ESN services (<i>n</i> =59)	
Charges included in the Clinic Consultation/Visit Fees	22 (38.6%)
Variable charges as per ESN services utilized	6 (10.5%)
Govt Setup/Charitable Setup so No charges	27 (47.4%)
Standard per visit ESN charges	2 (3.5%)
How much do you or your institution pay the ESN?	
Fixed salary	17 (29.8%)
Fixed salary plus incentives	6 (10.5%)
Standard salary as per the prevailing Nursing Scale (Govt or Corporate hospital)	23 (40.4%)
Standard Salary as above plus additional remuneration for extra hours/work done	9 (15.8%)
Variable Salary depending on income and patients seen	2 (3.5%)
Do the ESNs that work with you have opportunities for career progression	
Unaware of any career progression	17 (29.8%)
Regular promotions based on expertise and additional skills obtained	11 (19.3%)
Yearly assessments and increments in pay/perks	24 (42.1%)
Periodic negotiation of pay and perks	5 (8.8%)

**n*=number of respondents, DSN=Diabetes Specialist Nurse, ESN=Endocrine Specialist Nurse, Govt=Government